10-95-33B

UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

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INTERVIEW OF DENNIS KING

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WEDNESDAY, OCTOBER 18, 1995

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3:08 O'CLOCK P.M.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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INTERVIEWERS:

LARRY ROBINSON	Chief Interviewer
JOHN GLENN	Team Leader
GREGGORY GONECONTO	
BETSY ULLRICH	

ADDENDUM/ERRATA SHEET

Page	Line	Correction and Reason for Correction
22	21	— The monday that he referred to was 8/14. He told me about his attempt to locate the material on 8/14 in our 8/21 conversation.
25	16	— I went back to the first of August
29	1	— But he doesn't work with isotopes
33	24	— one bare Uranium charm
37	8	— Hynes
37	1	— I'm not sure what this line says
38	11	— Summa
38	13	— Them = police (MIT)
39	10	— as sort of a mobile . . . —
42	14	— Dr Summa (Tonegawa)
44	19	— Mitch + Francis decided to remove isotope stocks from lab and prohibit use in the lab
45	2	— They took the isotope before the lab meeting occurred
46	15	— There was some backflow of 3H into a pump that I reported to RPO Robert in Summer of '94 (minus)
48	17	— dCTP
48	18	— dATP ? ? omitted
59	16	— frame ?
64	16	— team ?

Page ____ Date 10/27/95 Signature [signature]

P-R-O-C-E-E-D-I-N-G-S

(3:08 p.m.)

CHIEF INTERVIEWER ROBINSON: For the record, this is an interview of Dr. Dennis King. It's Wednesday, the 18th of October 1995, 3:05 p.m.

The interview is being conducted on campus Massachusetts Institute of Technology, in connection with an incident investigation team investigation of an internal contamination of Phosphorus 32.

Dr. King, I'll just introduce myself to you, and we'll go around the room and let everyone present at the interview let you know who they are before we start talking.

DR. KING: All right.

CHIEF INTERVIEWER ROBINSON: My name is Larry Robinson. I am with the Office of Investigations of NRC.

MR. GONECONTO: My name is Greg Goneconto. I'm a Special Agent with the U.S. Nuclear Regulatory Commission, Office of the Inspector General.

MS. ULLRICH: I'm Betsy Ullrich. I'm a Senior Health Physicist with the NRC Region One office.

TEAM LEADER GLENN: And I'm John Glenn, and I'm the leader of this investigation team. And in my regular life, I'm in charge of rulemaking for radiological --

DR. KING: All right.

CHIEF INTERVIEWER ROBINSON: And the purpose of the interview, as I briefly stated, Dr. King, is in mid-October -- or mid-August, excuse me -- there was an apparent internal contamination of Dr. Lee, one of the researchers that works in your lab.

And the purpose of the IIT is to determine the cause -- if we can, the cause of that event, the facts and circumstances surrounding that event, and any information that, obviously, witnesses that are in the proximity of the lab may have to be able to provide regarding this incident.

In your capacity as I believe -- exactly what is your title at the lab? What is your capacity at the lab?

DR. KING: I am considered a lab manager, which is -- in a research lab is sort of a -- it's not well-defined. It depends on the lab. But basically, I do a lot of sort of coordination and make sure things go properly, a typical managerial type of situation. And I'm also a scientist as well, so it's sort of a mixed role for me.

CHIEF INTERVIEWER ROBINSON: And how long have you been here at MIT?

DR. KING: I've been here a year ago in April, so about a year and a half.

CHIEF INTERVIEWER ROBINSON: I see. And how long have you been a research scientist?

DR. KING: After I -- I got a Ph.D. in '74, and I've been in research ever since. In this area, I've been here since about 1974.

CHIEF INTERVIEWER ROBINSON: Where did you do your -- did your do your Ph.D. work here?

DR. KING: I did my Ph.D. work in Texas.

CHIEF INTERVIEWER ROBINSON: Texas.

DR. KING: Yeah. And then I did a post-doctoral fellowship at Joslin Diabetes Foundation, and I was there until around 1980. And then I was briefly at the Medical School, Harvard Medical School, for a year, and then I was at Harvard Biological Labs for 12 years before I came here.

CHIEF INTERVIEWER ROBINSON: And your particular research specialty, or if there is one?

DR. KING: It has evolved over the -- I was a physiologist -- trained as a physiologist in graduate school, and moved progressively from cellular biology into molecular biology, and -- like many other people. The last lab I was in was pretty -- it was a molecular genetics lab.

CHIEF INTERVIEWER ROBINSON: Well, before we get in -- you know, with that background, before we get into the substance of the interview, just so you understand, we are transcribing these interviews only from the standpoint of the fact that it makes it easier

conversationally, rather than us sitting here taking voluminous notes.

DR. KING: Sure.

CHIEF INTERVIEWER ROBINSON: You'll have the opportunity to review the transcript, if you so desire. It will be available within 24 hours after this interview. So if you desire to review it, take a look at it, and make any additions or notations that you desire, you can contact either Dr. Glenn or our administrative assistant. Cherie Siegel is her name.

DR. KING: Okay. And what will [redacted] all of these transcripts that will be made?

CHIEF INTERVIEWER ROBINSON: Well, these transcripts will be made part of the report, the record of the incident investigation team, or at least they will be exhibits or attachments to it. And, of course, that will be published as a NUREG, and the exhibits themselves, the transcripts, there's a possibility that they may go to the public document room.

DR. KING: Right. Right.

CHIEF INTERVIEWER ROBINSON: Okay. So just so you understand that. Okay.

I'm going to take you back to August 19th of this year. This is the date that the contamination incident took place. That was a Saturday. Do you recall

your schedule, your presence in the lab, at -- in August? Do you have any kind of a diary or notebook that talks about that?

DR. KING: No. But my -- I have a pretty rigid routine I follow.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Being a more senior, established person, I don't usually -- I try not to go on the weekends, so I've -- my schedule usually, almost invariably, is to -- I'm here from about 9:00 in the morning until roughly 9:00 at night, maybe 10:00. Occasionally, I might leave a little earlier, but for five -- usually about five days.

CHIEF INTERVIEWER ROBINSON: I see.

DR. KING: I'll either leave early, around 7:00, on Wednesday or Friday, one of those two days. So on Saturday or Sunday, I am rarely here.

CHIEF INTERVIEWER ROBINSON: Would you have a knowledge of the activity or the presence of other researchers in the lab on the weekend? Is that --

DR. KING: No. That's not a -- this lab is a very busy -- you know, there's 37 people in there. So you can always certainly find people on the weekends. It's a seven-day-a-week lab. But on the weekend, there is fewer people than during the week.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: But as far as knowing -- knowing exactly who was there, it's pretty hard, other than it's -- you can pretty much bet most of the primary research people are there some time during the weekend, unless they're traveling.

CHIEF INTERVIEWER ROBINSON: And of the 37, how many of them are --

DR. KING: That's administratives, yeah.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: There's two administrative staff people.

CHIEF INTERVIEWER ROBINSON: Of the 37, how many would be in that classification of primary research people?

DR. KING: Well, aside from the two administrative people, there are -- one technician is out on leave, and the other three technicians or four technicians are generally five-day-a-week people, unless they need to come in for some reason on Saturday or Sunday. They don't routinely schedule them. So you can subtract that group.

CHIEF INTERVIEWER ROBINSON: Okay. I have a list of the names. Can you, off the top of your -- without consulting that list, off the top of your head, name the smaller of the two groups, and then just give me the names

so that we could take a look at --

DR. KING: The smaller?

CHIEF INTERVIEWER ROBINSON: The smaller of -- in other words, the people that would normally just be there on a five-day-a-week. I think that's the --

DR. KING: Oh, yeah. There's Rebecca Zacks is a technician.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Dina Lim is a technician. Sue Ying is a technician. Fabienne -- I'm not sure I can pronounce the last name. She's from Belgium.

CHIEF INTERVIEWER ROBINSON: Can you roughly spell it?

DR. KING: No.

(Laughter.)

CHIEF INTERVIEWER ROBINSON: Fabienne?

DR. KING: Fabienne is her first name.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: She is -- she is a technician. She probably wouldn't be here as well. So those people definitely.

CHIEF INTERVIEWER ROBINSON: Here we go. Van de Keere?

DR. KING: Van de Keere, Fabienne Van de Keere. She -- this person here.

CHIEF INTERVIEWER ROBINSON: Okay. That's V-A-N, small D-E, capital K-E-E-R-E.

DR. KING: Okay.

CHIEF INTERVIEWER ROBINSON: And these are the folks that would just normally be there Monday through Friday, and --

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: -- would not be in on the weekends?

DR. KING: Exactly.

CHIEF INTERVIEWER ROBINSON: If you could, kind of go down through that list and indicate to us --

DR. KING: Sure.

CHIEF INTERVIEWER ROBINSON: -- who might likely be in --

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: -- there on Saturday and Sunday.

DR. KING: So this list -- sure. Let me just look at it a second.

CHIEF INTERVIEWER ROBINSON: Sure.

DR. KING: And see how current it is. It's a little bit older.

CHIEF INTERVIEWER ROBINSON: Yeah. If there are any additions to that list that you know of, please

write them on there.

DR. KING: So if we start from the top here, Philip Ashton-Rickardt is gone. I mean, he has left for Chicago before this happened.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: As well as Antonio Bandeira. They've both gone to jobs.

CHIEF INTERVIEWER ROBINSON: Okay. Chong Chen?

DR. KING: So Chong Chen is a regular. He is -- and it indicates what their positions are here beside.

CHIEF INTERVIEWER ROBINSON: And would he be in on the weekends?

DR. KING: Yeah. He could easily be in on the weekend.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Dong Chen as well.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Michael Cho is an undergrad, and I would -- he is, at the moment, dealing with undergrad stuff, so it's very unlikely he would be here.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: But he is possible.

CHIEF INTERVIEWER ROBINSON: Could be.

DR. KING: Yeah, possible.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Joe -- Joe Delaney is like -- you know, could easily be -- be here as well.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Alex is currently -- he is no longer with us, actually, although he still comes in and out of the lab.

CHIEF INTERVIEWER ROBINSON: How do you pronounce his last name?

DR. KING: Ebralidze.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: He's a Russian fellow. He has just recently left the lab in October. But during this particular time, he was not present very much. I can't really say whether he -- it's possible he could be here, but he was not carrying out routine experiments.

CHIEF INTERVIEWER ROBINSON: And he left in the early part of this month?

DR. KING: The early -- yeah, I think about the 4th or 5th or something, of October, although he is still in the area. Officially, he left, yeah.

David Gerber is a full-time guy, and he could have been here easily.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Linda as well.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Maz as well.

CHIEF INTERVIEWER ROBINSON: Maz Hasan?

DR. KING: Yeah, Maz Hasan.

Heather Hinds is doing work at Cold Spring Harbor, so she is -- I can't recall. She comes and goes for brief visits. I'm almost positive -- I don't -- she was not here, because I remember talking to her about it on the phone --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: -- at the time.

CHIEF INTERVIEWER ROBINSON: You don't think she -- she indicated she wasn't here at the time?

DR. KING: Well, I know she wasn't here, because she was --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: -- at Cold Spring Harbor when I talked to her, so --

CHIEF INTERVIEWER ROBINSON: Albert Hsu?

DR. KING: Albert Hsu is an undergraduate as well, who is in the same category as the other fellow. He is just not around much right now. Whether he was here then or not is a possibility.

CHIEF INTERVIEWER ROBINSON: But not probable?

DR. KING: But not probable.

CHIEF INTERVIEWER ROBINSON: John Huang?

DR. KING: Yeah, he is a regular guy.

CHIEF INTERVIEWER ROBINSON: Shu Ying Huang?

DR. KING: Yeah. Now, that's one of the technicians I was speaking of. She is a five-day-a-week person.

CHIEF INTERVIEWER ROBINSON: So she wouldn't --

DR. KING: She does come in on Saturdays sometimes, though, because of the -- there's a piece of equipment that she deals with that she comes in. And I don't -- you'd have to ask her whether she was there that day or not.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: I don't know. But it's possible.

CHIEF INTERVIEWER ROBINSON: Possible, but not probable.

DR. KING: Yeah. Right.

CHIEF INTERVIEWER ROBINSON: Okay. Iwasoto (sic), Iwasato?

DR. KING: Yeah, Takuji. Yeah, Takuji Iwasoto. He is a likely person. Yeah, he is here.

CHIEF INTERVIEWER ROBINSON: Juan Lafaille?

DR. KING: Juan Lafaille is another senior person that is at the moment moving to New York, and I -- I'm not sure whether he was here then or not. It's possible either way, actually. He has been going back and

forth for the last few months and setting up a lab in New York.

CHIEF INTERVIEWER ROBINSON: Christiaan Levelt?

DR. KING: Yes.

CHIEF INTERVIEWER ROBINSON: He would have --

DR. KING: He's a regular guy, yeah.

CHIEF INTERVIEWER ROBINSON: Okay. Dina Lim?

DR. KING: She is one of the technicians, and I would say it's likely she wasn't here.

CHIEF INTERVIEWER ROBINSON: Probably not.

DR. KING: Yes.

CHIEF INTERVIEWER ROBINSON: Chanel Lovett?

DR. KING: She is the person on leave, so she wasn't here.

CHIEF INTERVIEWER ROBINSON: She was on leave during that week?

DR. KING: Yeah, she is -- she had a -- has had a real serious problem with an early pregnancy, and she actually was hospitalized for a number of weeks during that period.

CHIEF INTERVIEWER ROBINSON: Suzanna Marusic-Galesic?

DR. KING: Yeah, she would be a likely person.

CHIEF INTERVIEWER ROBINSON: Ken Poss?

DR. KING: Yes.

CHIEF INTERVIEWER ROBINSON: Haydn Prosser?

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: Zhuo Qian?

DR. KING: Zhuo, yeah, he would have been a regular guy. Yeah.

Toshi Sasaoka --

CHIEF INTERVIEWER ROBINSON: Sasaoka.

DR. KING: Yeah, he would be there -- a likely, too.

CHIEF INTERVIEWER ROBINSON: Jie Shen?

DR. KING: Jie Shen, a woman. Yeah, she would be most likely --

CHIEF INTERVIEWER ROBINSON: Okay. Fabienne --

DR. KING: Fabienne --

CHIEF INTERVIEWER ROBINSON: Did you say she would or she wouldn't?

DR. KING: No, she is a technician, and I -- I don't think she makes a practice of coming in if she can help it.

CHIEF INTERVIEWER ROBINSON: Probably not.

Yanyan Wang?

DR. KING: Yeah. She would be likely to be here.

CHIEF INTERVIEWER ROBINSON: Min Wu?

DR. KING: Yes, she would be here as well.

CHIEF INTERVIEWER ROBINSON: Ming -- is it --

DR. KING: Xu, Ming Xu.

CHIEF INTERVIEWER ROBINSON: X-U?

DR. KING: Yeah, X-U, Ming Xu. Ming is another senior guy that is in the process of moving to Cleveland -- Cincinnati. And I'm not sure where he was at the -- it's --

CHIEF INTERVIEWER ROBINSON: Probably not?

DR. KING: I don't know. I really am not sure.

CHIEF INTERVIEWER ROBINSON: Possible.

DR. KING: Somehow I think probably not, because I remember early on explaining to him what had happened and everything. So chances are he wasn't here.

CHIEF INTERVIEWER ROBINSON: Rebecca Zacks?

DR. KING: Rebecca is a technician, yeah.

CHIEF INTERVIEWER ROBINSON: And five-day-a-week?

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: Probably not.

Patrick Kunzler?

DR. KING: Yeah. Patrick is likely.

And then Sosumo is -- was in Japan, and --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: -- and I was -- I walked into it on Monday.

CHIEF INTERVIEWER ROBINSON: And are there any additions? I mean, you said this was kind of an old list. Are there any other --

DR. KING: No, it seems to be about right. If I think of anybody, I'll --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: -- I'll remind you. But I --

CHIEF INTERVIEWER ROBINSON: And you weren't in on that, so --

DR. KING: No. No, I was not.

CHIEF INTERVIEWER ROBINSON: Okay. And there's no record of ingress or egress from the lab by any --

DR. KING: No.

CHIEF INTERVIEWER ROBINSON: -- of the researchers? They don't sign a log or anything like that?

DR. KING: It's a typical academic research lab in a very busy location. It just tends not to shut -- it has a peak time of the day and into the evening, and then, you know, at either end there's sort of a few people around, maybe all night sometimes.

CHIEF INTERVIEWER ROBINSON: Okay. When was the first time that you became aware of this incident?

DR. KING: On the Monday following the incident. I walked -- I came in and a couple of folks told me that the thing had happened. And shortly after that, I

ran into Yuguing, and then we began -- you know, we discussed it.

CHIEF INTERVIEWER ROBINSON: You talked to him in the lab that month?

DR. KING: Yeah. Yeah, I did, asked him what happened and, you know, we began to proceed from there.

CHIEF INTERVIEWER ROBINSON: Which of the folks were the ones that told you as you came in?

DR. KING: Well, my little office there is right in 342, and there's a bench -- you know, there's a couple of -- Rebecca Zacks and Christiaan Levelt worked right there. They -- I usually run into them when I first come in, so they told me about it.

CHIEF INTERVIEWER ROBINSON: Okay. Okay. And what was the nature of your conversation with Yuguing? What did he say?

DR. KING: Well, for me, it was fact finding. You know, I said, "What happened?" And he said, "He got contaminated." And we sat down and he sort of went over what had happened up to that point, and, you know, with his -- the process with the radioisotopes people. You know, how it had gone.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And then we --

CHIEF INTERVIEWER ROBINSON: What was his

general demeanor? How -- was he worried? Was he nervous? Was he calm?

DR. KING: Well, he -- not knowing -- you don't know Yuguing, but he -- he was very focused on the situation. That's the way I can say it. Not -- he doesn't show a lot on the outside, other than he gets very focused, you know. He sort of approached it that he -- he was going to figure out what happened.

CHIEF INTERVIEWER ROBINSON: He was a researcher in the lab when you first came. He was already there.

DR. KING: Yeah, he has been there several years, yeah. Right.

CHIEF INTERVIEWER ROBINSON: Okay. So go ahead. What did you do in the way of fact finding? What did you find out?

DR. KING: Well, I -- you know, he just described -- I can go through what he described.

CHIEF INTERVIEWER ROBINSON: Go ahead.

DR. KING: I mean, he -- he said that -- he described how he detected it, you know, at the -- when he wraps up a labeling, he tends to -- his routine is to put his hands in front of a monitor and check them. He's primarily interested in his hands, you know. So that's what he has been doing. And that day, when he checked it,

they were hot.

So he figured, well, he must have some on his gloves, so he did what most people do. I mean, he took his gloves off, washed his hands, and then checked them again and they were still hot. And then he took the monitor and realized his whole body was hot.

So after that, I don't -- I can't recall exactly the exact procedure he followed, but it involved -- the thing I was interested in, he had called the isotopes people. They responded.

CHIEF INTERVIEWER ROBINSON: Who was that? Do you know?

DR. KING: It was Mitch and Don.

CHIEF INTERVIEWER ROBINSON: Don Haes?

DR. KING: Yeah. I don't know which one first, but he -- either he talked to the campus emergency thing first. I don't know exactly how it happened, but they actually went out to his house, I guess, that weekend. I'm not exactly sure when, but -- and checked everything that they could, and then checked his clothing and discovered that at a certain point his underwear was hot, you know, and that was quite a scientific thing, I guess.

Yuguing said that he had -- he washes his clothes once a week or something, and that he knew, you know, from the fact that these were on the bottom that it

must have happened that day. So that really is the source of the day it happened, you know, the underwear being labeled --

CHIEF INTERVIEWER ROBINSON: Right.

DR. KING: -- on that Monday, I guess, or what -- or Saturday, whenever it was.

CHIEF INTERVIEWER ROBINSON: When you were talking to him on Monday, did you ask him, or did he tell you if there was anyone else in the lab with him when he discovered that his hands were hot?

DR. KING: I don't really -- I don't remember talking to him about that exactly.

CHIEF INTERVIEWER ROBINSON: Did you do any investigation -- have you found out anything from talking to the other folks in the lab, if anyone knows anything about this incident?

DR. KING: Well, yeah, nobody knows anything about it. You know, over the time -- the thing that happened right in that same conversation is that I was -- it was brought to my attention right away by Yuguing that he wanted -- I asked him if there's anything I can do, you know, just -- I was trying to help him get started with what he needed.

There was a long talk about the whole procedure with radioisotopes, because he took very early a position

that they were wrong, in terms of their estimates, and he did a lot of research himself on how -- you know, he took on a lot of the responsibility of figuring out how much was inside, you know. As being a scientist, you know, he -- that was --

CHIEF INTERVIEWER ROBINSON: Sure.

DR. KING: -- his sort of way of dealing with it. But -- and he also mentioned to me he wanted me to check a particular vial of isotope that was -- we routinely get isotopes. Like P-32 is our major isotope, so we have a standing order for that, because we get CTP on -- every week, and every other week we get also ATP with it. And then we make special orders if we need more, but that's sort of our routine.

And there was a vial -- and, of course, everybody is interested in the freshest vial that comes in, and he wanted that vial. And when he went to get -- locate it in the freezer, it wasn't there, I guess.

CHIEF INTERVIEWER ROBINSON: And this was on the Monday --

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: -- that you were talking to him.

DR. KING: Yeah. Well, I'm not sure -- I think the day -- I can't remember exactly now how that went. I

can't remember exactly the whole story there, other than he focused me on that particular vial.

CHIEF INTERVIEWER ROBINSON: And to your knowledge, it was only because --

DR. KING: He had done --

CHIEF INTERVIEWER ROBINSON: -- it was the freshest vial? Or any other reason why you were --

DR. KING: I mean, according to his -- well, it's sort of a common thing in labs that everybody sort of converges on that fresh vial.

CHIEF INTERVIEWER ROBINSON: Sure.

DR. KING: So if he is doing work that day, he would go to that vial and not worry about the other stuff from the week before. And so does everyone else. So that sometimes the routine in our lab, since we don't have a hot room, people have to -- they take the isotope to their protected area, and they take an aliquot, and they put it back into the storage place.

And so sometimes a person will hand it to the next person, and they'll take it to their place. So the question was, where was it? Was it that, or what, you know? So he sort of wanted to know more about that --

CHIEF INTERVIEWER ROBINSON: I mean, when he --

DR. KING: -- that vial.

CHIEF INTERVIEWER ROBINSON: Yeah. How much

was left in that vial, is that -- was that his point? Or what --

DR. KING: He had a sense that that might have been a vial that was used to poison him. He actually gave me that impression that day. I mean, he -- he definitely was looking at that as a probable source.

CHIEF INTERVIEWER ROBINSON: Did he give you any logic behind that thinking?

DR. KING: No. No, I mean, he sort of had already assumed -- you know, he had already had that idea that somebody must have done this, and this must be the vehicle for it. So I went and did some investigation of it, and asked -- found -- at first, he thought that perhaps the vial -- nobody had seen that vial.

Well, it turns out that several people did use that vial, and it was transferred. But in the -- so far, I've only been able to account for -- I forget the number -- a little over half of that vial, in terms of usage, just from me interrogating people that were working during that period of time.

So that is the sort of circumstance around -- you know, he directed me toward that. I did what I could and did that several times, you know, and I sort of left it back in August, or whatever. I haven't pursued it any further, you know, but that's -- that's sort of the hole

that's left.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And after that, it became much more of how much -- there was a -- there has been a really major thing on how much he took in, and Yuguing's emphasis has been that -- that the radioisotopes people are -- came in with an extremely low estimate. He knew that it was a lot more than that, and it has been this battle, as you know, probably as to whose measurements are correct. That was the entire focus of that -- that situation for a week or two.

CHIEF INTERVIEWER ROBINSON: And in addition to just your looking at the quantity used from that vial, was there kind of an overall inventory taken over in the lab?

DR. KING: Yeah. No, I did -- I went back to the first of July, I guess, you know. I can't remember right now how far back. But basically, the weeks around that time, just to check things out to see who had been using what, and I questioned each person, you know, and got some estimates on them.

We deal in volumes, you know, and so my estimates are in volumes. You know, people use 50 microliters or 10 microliters. They don't talk about millicuries.

CHIEF INTERVIEWER ROBINSON: And is that data

coming off of -- out of their notebooks, or had data coming off usage sheets of --

DR. KING: I tried to -- you know, it was a fairly -- fairly quick survey, although I did it several times. And some -- initially, it was by just memory, and then I went back and some people looked back in their notes. I tried to get a little -- a little more accurate, but -- and I had a sense that I pretty much exhausted what people had done, you know, during that period of time, because most people know. They do so many labelings a week, and they can sort of -- that's not to say that there might be some holes there somewhere.

CHIEF INTERVIEWER ROBINSON: Knowing that --

DR. KING: But that one vial I never -- usually, you can sort of psyche out if -- well, somebody just doesn't remember. But I -- somehow I wasn't able to fill that hole yet anyway.

CHIEF INTERVIEWER ROBINSON: And that hole being about half of the volume in that vial?

DR. KING: Yeah. I mean, you guys have the number somewhere, but it's not exactly half. It comes -- it was -- I think I estimated around 450 microcuries, or something like that. I mean --

MS. ULLRICH: What's the normal vial size in your standing order? Is it a millicurie?

DR. KING: A millicurie, yeah.

MS. ULLRICH: Okay.

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: And in terms of --

DR. KING: But it was -- that was -- those numbers are very -- are definitely estimates, as you know. It's a retrospective survey. I could get it maybe a little more accurate by going back through everybody's notebooks.

CHIEF INTERVIEWER ROBINSON: And that's in a -- in some type of a liquid solution?

DR. KING: Yeah. It comes in a buffer and --

CHIEF INTERVIEWER ROBINSON: Buffer.

DR. KING: -- very small -- in 100-microliter aliquots.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Yeah. A millicurie, yeah.

CHIEF INTERVIEWER ROBINSON: 100 microliters of fluid?

DR. KING: Yeah. Yeah.

CHIEF INTERVIEWER ROBINSON: Okay. In each of the vials?

DR. KING: In a V-shaped vial. And the routine -- as people take aliquots. Every -- that's almost everywhere.

CHIEF INTERVIEWER ROBINSON: And you'll have to

excuse maybe my basic now, but how -- what's the volume in an aliquot?

DR. KING: 10 microliters --

CHIEF INTERVIEWER ROBINSON: 10 micro --

DR. KING: -- you know, is a standard. Some people -- if, you know -- if some people are doing a lot of labeling, they might withdraw 50, maybe even -- you know, they might take the whole millicurie if they've got a tremendous amount. But that's a lot of labeling, you know. A routine labeling is maybe 10 -- 10 microliters, a very small volume. The whole thing is quite small in volume; 100 microliters is very tiny.

CHIEF INTERVIEWER ROBINSON: And at that point in time, any of the -- all of the researchers essentially had been trained and were authorized users? Or can we go down this list, and you can --

DR. KING: No, there's no way I can -- all of those people have gone through the MIT system. Yeah, they can't work in there if they don't.

CHIEF INTERVIEWER ROBINSON: Okay. So they've all -- they could all draw at that time.

DR. KING: Yeah. Any of those people that -- except for Chong Chen is an electrophysiologist. I don't -- I'm -- he doesn't have a badge.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: But he doesn't work with us.

CHIEF INTERVIEWER ROBINSON: But he is the only one on this list, really, basically?

DR. KING: Yeah. They are all quite -- very experienced people, you know, people that have been in the business. There are a few people that come in that aren't molecular biologists that have to learn the use of isotopes, because we're beginning to be more of a neurobiology lab, like Chong and people like that.

But most of the people that have been there any length of time, and some people have been there a long time, are quite experienced with radioisotopes.

CHIEF INTERVIEWER ROBINSON: Are any of the lab personnel, to your knowledge, do any -- would any of them have any reason to dislike Dr. Lee enough to --

DR. KING: Not that I know of.

CHIEF INTERVIEWER ROBINSON: -- to contaminate?

DR. KING: No. Not that I know of.

CHIEF INTERVIEWER ROBINSON: Are there any professional jealousies among the lab researchers?

(Laughter.)

DR. KING: Well, of course, you know. Of course. I mean, the whole -- this whole community is very -- it's -- this is a very competitive place, a very -- not just in our lab, but on -- it's really -- competition is

more between our lab and the other labs around the country. It's a competitive field of research.

Our lab -- there is an attempt made, obviously, to not do too much overlap in a -- or you become less efficient with what you're trying to accomplish. So each person has their own emphasis and their own --

CHIEF INTERVIEWER ROBINSON: Around that period of time, were you aware of any arguments or problems between Dr. Lee -- specific problems between Dr. Lee and any of the other lab researchers?

DR. KING: I mean, in fact -- I mean, Yuguing is in the process of moving to -- he has a position out in Illinois that he got during the year. And the senior fellows, the last year they're there, often times it's a transition year for them. First, it's interviews, and then getting negotiations with the new university, planning a lab, so he is -- was in that process through the late spring and all summer, you know.

So most of the conflicts in the lab, routine conflicts, center around space and, you know, who has got what pipette, and so, you know, just routine conflict that can -- you know, it comes around that kind of work-related stuff, personality clashes, whatever. But it was -- that's what made it really surprising, because he was not in the loop there for months and months. That was -- he had just

come back -- actually, he had just come back into the lab to do a little work when this happened, which was really what was amazing about it. You know, it was just --

CHIEF INTERVIEWER ROBINSON: Was he out in Illinois, or was he just busy with that process, or --

DR. KING: I don't know. I -- like I said, he wasn't present as much the last -- during the months prior to that, but he was back and forth. You know, it's hard to keep track of where people are.

CHIEF INTERVIEWER ROBINSON: Is there anything that sticks out to you that could be of note to us as a possible --

DR. KING: No. No, there's not.

CHIEF INTERVIEWER ROBINSON: Nothing that sticks out in your mind that you've noticed?

DR. KING: No.

CHIEF INTERVIEWER ROBINSON: No disputes? Mr. Lee hasn't put any of the other lab researchers on report with you for anything?

DR. KING: Report?

CHIEF INTERVIEWER ROBINSON: Like, say, violating procedures or anything? That type of thing?

DR. KING: No. No.

CHIEF INTERVIEWER ROBINSON: Is Mr. Lee kind of a stickler for procedures?

DR. KING: He is an intense person, and he is a very aggressive person when he works, you know, in terms of his efficiency, not aggressive, you know, behavior-wise. He is very focused, and he is a very determined person. So, you know, all of the stuff that goes with that kind of personality is -- you know, he is not gentle or a loveable type of person, you know, but he is certainly within -- you know, he is a -- he is not atypical of a lot of research people, you know. He is in an area that's a little bit different than anyone else in the lab.

CHIEF INTERVIEWER ROBINSON: How?

DR. KING: Meaning that he does -- a lot of his work revolves around histology, and so that that leads him into the kind of activity that's separate from most of the people in the lab. Not -- even some of the work he does has to be done in other parts -- other parts of the facility, like where you need to section tissue or work on microscopes, and stuff like that.

CHIEF INTERVIEWER ROBINSON: Did he ever complain to you about somebody altering one of his code sheets that he was --

DR. KING: I heard -- I heard about that after this thing happened. And he came to me because someone -- someone else had brought that to my attention. You know, Sue Ying, who runs that machine --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: -- mentioned -- mentioned that incident, that that -- Yuguing had brought that up as something that had happened to him.

THE WITNESS: Oh. What did --

DR. KING: Somebody had altered the C -- the routine on that machine, it makes -- it makes chains of -- short chains of DNA by putting bases on sequentially, so it just keeps adding bases. It's sort of a dumb machine. It just adds things.

So the routine is that investigators will write -- you can write down the sequence you want, and it will make it. Technician Sue has to maintain the machine, program the information, and then it runs by itself, you know, until it's finished. So the log for that -- the question Yuguing raised was that there was one of these bases that had been changed from a C to a G by someone putting a T in there.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And he said that's not his writing. And I think the question -- the thing that drove him back to that is that the particular probe -- the DNA didn't work, and they were looking for why, I think, and they discovered this one basic chain. I think that's how it -- because Sue had just mentioned -- after this thing

happened, she had mentioned that to me.

CHIEF INTERVIEWER ROBINSON: But he didn't bring it to you.

DR. KING: He didn't -- but he did come by and tell me that I should keep that confidential, because it was part of the thing -- it was part of his sort of collection of evidence he wanted to present. Yeah.

CHIEF INTERVIEWER ROBINSON: So he told you that you should keep --

DR. KING: He didn't want that generally known. I said fine. Yeah, I said, "Sue just had mentioned that to me, and I knew about it."

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And she had told him that she told me. That's why he came to me and said that. So --

CHIEF INTERVIEWER ROBINSON: When somebody -- when one of the researchers turns in a code sheet to Sue, does she usually work on that code sheet right then, or are they --

DR. KING: No. They --

CHIEF INTERVIEWER ROBINSON: -- or is there a backlog they accumulate?

DR. KING: The book just sits by the machine, and, you know, people add to it, and she -- I mean, there's usually a huge backlog, you know, and she is always trying

to catch up. Or somebody wants it right away, and she'll skip up to it. But it's very accessible and everything.

And I know that David McCoy mentioned that -- has mentioned that to me as well. I mean, he has that as one of the things in his little pieces of evidence.

CHIEF INTERVIEWER ROBINSON: You told him basically the same thing you just told me, right?

DR. KING: Yeah, exactly. Maybe not in as much detail, but I told him the same thing.

CHIEF INTERVIEWER ROBINSON: Okay. Have you formed an opinion regarding Dr. Lee's conclusion as to when he was contaminated?

DR. KING: The time?

CHIEF INTERVIEWER ROBINSON: Or the day.

DR. KING: The day?

CHIEF INTERVIEWER ROBINSON: Or do you know that much about it?

DR. KING: Like most of this, it's like you can't -- I mean, what can you say? I mean, it's basically a story that has been presented, you know, based on what everybody knows now, and there's not -- I don't -- I can't make any real conclusions about it, other than this is -- that, you know, Yuguing is making this claim that it happened then. And based on the evidence with the underwear and, etcetera, you know, I --

CHIEF INTERVIEWER ROBINSON: Did he kind of discuss that and go through that with you independently, or did that just come out as a result of, say, the --

DR. KING: Do you mean the --

CHIEF INTERVIEWER ROBINSON: -- McCoy talking to you, or something like that?

DR. KING: Sequence of it.

CHIEF INTERVIEWER ROBINSON: Yeah. Well, did he talk to you about his analysis of when he was possibly contaminated?

DR. KING: Oh, yeah, he has --

CHIEF INTERVIEWER ROBINSON: On his own, he came to you and --

DR. KING: Oh, yeah, we -- I mean, we -- initially, I mean, I had tried to offer as much of an ear as I could, and he -- I'm considered a pretty neutral person in the lab, and, you know, he is -- he basically went through most of his thinking with me about it. And also, I sort of tried to give him any advice I could about it.

So I got most of it -- most of it is from him, and then I heard later from Mitch and the guys, you know, what -- what had happened as well. But most of my information about it is from Yuguing, yeah.

And I tried -- I was really concerned that --

the sooner it was gone, and I was really -- the way it was -- since Yuguing was taking this sort of defensive stance and -- with the isotopes people, and thinking that maybe somebody did it to him, and all of that, that I was trying to steer -- I wanted to steer him to somebody like Phil Sharp. I finally got him -- advised him to talk to Phil Sharp, because he was the -- at the time, in charge of the Cancer Center because Richard Hinds was gone.

CHIEF INTERVIEWER ROBINSON: I see.

DR. KING: So I sort of -- he didn't want to do that at first, but I said, "Well, I would definitely -- I think it would be a good idea to talk to someone about this, just to get help."

CHIEF INTERVIEWER ROBINSON: So Dr. Tonegawa was still in Japan at that time?

DR. KING: I did talk to him about it. I updated him on what was happening about it, you know.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And said that, you know, what I had done. And then Yuguing came to me right during that particular time and was wondering about police -- what -- you know, who is responsible for investigating this. I mean, my sense is he doesn't really necessarily know the American system that well, or he has some sort of foreign impression of it. I mean, he was just curious as to what

-- who he could turn to.

And I said well -- I would -- I would basically think that the campus police would be where you'd start, and the Cambridge Police. It would be their jurisdiction for something like that, and that -- I said in America, if you don't -- he sort of acted like, well, who is going to do that? And I said, "Well, my guess is you're going to have to do it, because in America you just don't -- you basically -- if somebody doesn't complain, if you don't complain, then nothing will happen about it."

But I suggested he wait until Sosumo got back, but he did -- he went ahead and went over and made an initial contact with them that same day I guess. He decided to do that, and I said, you know, I said, "Well, you know, you should decide whether you want to do that or not and then do it," you know.

CHIEF INTERVIEWER ROBINSON: About how long -- was that during the week after it happened, or do you remember?

DR. KING: I can look back. No, it was a little -- I'm not sure if it was maybe two weeks. There might have been almost two -- I think it was the end of the second week after that. I can't -- I'll look back. When Sosumo was just due back the next -- the following Monday, so it was -- I think it was two weeks.

CHIEF INTERVIEWER ROBINSON: When you told Dr. Lee that he was going to probably have to file the complaint and start the ball rolling.

DR. KING: Yes.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Because several -- I mean, he did that, and then the whole thing with Phil Sharp and whatever. When he did that -- when he decided to do that, I went to the people in charge and explained where things were. That's the thing that was bothering me is there's sort of a middle management guy. I mean, I -- I was seeing this thing go on.

And then when it hit that point, I said, well, I'll have to go to these guys and explain it. So I went to them and told them the whole -- filled them in on all of the information as to what was going on. And that's when Phil Sharp had a meeting with Frank and everyone, and discussed --

CHIEF INTERVIEWER ROBINSON: Frank Masse?

DR. KING: They offered to have the -- anybody that Yuguing -- Phil Sharp was trying to make -- give him anything that he could to help him out, so -- because he was feeling, you know, at that point, like the whole system was trying to cover the thing up. That was his general impression. So the offer was made, well, you know, you can

-- you can certainly go anywhere else.

CHIEF INTERVIEWER ROBINSON: So you can't think of anyone specifically who would have any animosity towards Dr. Lee?

DR. KING: No, I'm not prepared to say something like that. I can only say that the --

CHIEF INTERVIEWER ROBINSON: Well, is your answer no or that you're not prepared to say something like that?

DR. KING: You know, animosity is a dangerous word.

CHIEF INTERVIEWER ROBINSON: Well, and I'm not talking -- I mean, I'm not talking about --

DR. KING: I'm talking about routine frictions that happen between people. I've had friction with the guy, you know, just over, you know, ordering a microscope, and where is it, and that sort of interaction. Yes, that happens, and I would say he's got that kind of personality that he is not afraid to confront, even if you're a friend, you know.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: So it's all putting -- you know, it -- I was mad, you know, and I went back at him to push him away on it. So I would say that's about as far as -- and he has had that kind of encounter with any number of

people, so --

CHIEF INTERVIEWER ROBINSON: Okay. Can -- I mean, were you -- other than the encounter between you and he, were you a witness to any of the other encounters?

DR. KING: No, I don't think I've ever seen -- I can't recall an incident that -- you know, other than I know -- I mean, I know the kinds of -- you know, he worked for the -- with the technician that was out on pregnancy disability. He had worked with her the year before, and she finally asked to be moved to a different person, because it was just too intense. I mean, he was just very -- he drives -- like I say, he is very focused and driven.

CHIEF INTERVIEWER ROBINSON: What is her name?

DR. KING: Chanel. Chanel Lovett, yeah.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: And she -- she left him last -- around, you know, the winter, in there somewhere. And any time there's a changeover like that there is -- you know, there is a lot of discussion. He fought for her for a while, and then, you know, but it was largely on her part that -- she requested that she be transferred to another person.

CHIEF INTERVIEWER ROBINSON: And when you say that he fought for her, do you mean he tried to keep her working for him?

DR. KING: Yeah. Yeah. He definitely did. Technicians in a research lab are a big item, you know.

CHIEF INTERVIEWER ROBINSON: All right. All right.

DR. KING: And, at the time, it -- when I first came into the lab, the system was to share technicians, which created all kinds of tensions, because when is she going to be finished? Each person has a half-time, so there was quite a bit of tension over that.

But again, it's over territory and timing, and so -- and she was kind of caught in that kind of thing, and it was making her very tense all of the time. So I helped her -- you know, I suggested, well, you should go and discuss this with Mr. Sosumo, and he is very good about helping people get into the right circumstance for themselves, you know. He doesn't want people doing things they don't want to do. But he -- there was a -- you know, there was a struggle over that.

CHIEF INTERVIEWER ROBINSON: Okay. Any other situations like that that you can think of?

DR. KING: No, I -- that -- that took up a good deal of the summer out -- you know, summer and fall. That was my first sort of encounter with -- that was a problem I was dealing with, in terms of coordinator and sort of peacekeeper. That was sort of an event. I don't know if

-- I don't know if -- prior to that what might have happened.

CHIEF INTERVIEWER ROBINSON: Okay. I have kind of exhausted my main line of questioning. Betsy, do you have --

MS. ULLRICH: Yes, I just want to take -- we'll step away from that directly and just talk about what you can tell me that the Radiation Protection Office did in your laboratory in terms of following up on the event, on the incident. Because I know you had some changes occur in the laboratory.

DR. KING: Yeah. Well, there -- very early on, they were just trying to -- that first week, it seems like they were trying to work with Yuguing, and they came over and discussed with me what had happened. They were working with Yuguing to do the measurements. They had checked -- they came in and checked everything. They did a total check of the lab to see if there was any contamination.

They checked his area. They checked the water coolers. they checked the refrigerator where the -- out near Sosumo's office. They checked everything, and then they came back and checked some more with some additional theories that it might be in Sharp's things, or whatever, you know? They were pretty exhaustive, I thought.

They -- so they did that sort of thing for it

seemed like a couple of days I guess.

MS. ULLRICH: Did they check areas outside the laboratory as well?

DR. KING: Well, the conference room and water cooler and everything are outside.

MS. ULLRICH: Okay.

DR. KING: And then they asked me -- I forget where I might have taken them, if there had been any other places, but there wasn't that much, you know, as far as obvious that -- other than his house, you know.

MS. ULLRICH: Right.

DR. KING: They really tried -- they began to get caught up -- I mean, Yuguing is a very demanding guy, so they -- they were beginning to realize that they -- and I had told them early on, I said, you know, Yuguing is very -- you know, he is an intense guy, so you can expect that he's going to, you know, want a lot of attention.

So they were trying to do -- and then I think they -- that week, they mentioned Frank, and they decided that he really needed to close the lab, at least just to get things -- to make sure they had control of what was going on. So they informed us that, you know, they were -- that we wouldn't be able to use the isotopes. They came over and got -- we had a meeting.

I asked them if we had -- we had a lab meeting

with Mitch and Don, and they explained the whole thing, and then they took the isotopes over -- back over here.

CHIEF INTERVIEWER ROBINSON: When you say "a lab meeting," do you mean all of the researchers or just you and Dr. --

DR. KING: No, I asked -- I said for a general -- our general lab meeting was on Thursday, and I invited them over.

CHIEF INTERVIEWER ROBINSON: Oh, okay.

DR. KING: I said, you know, people really need to -- everyone needs to be, you know, told, you know, exactly what is happening, that they're not going to be able to use the isotopes and ask questions. And I -- and Yuguing was invited -- everybody was invited to that meeting.

And so they took the isotopes back, and then once they -- once they decided -- you know, they went through whatever they did, you know, to evaluate things further, and then we talked, and that's where -- and then they decided that we could start working again with the stipulation that we kept things in very tight security and dispensed the isotopes individually -- you know, so that we -- and I -- and I, myself, and two other people have keys to that.

So that's the system I, you know, agreed to do,

and they accepted that, and we've been on that -- and we've been, you know, keeping tight logs since.

MS. ULLRICH: And has that changed just in your laboratory, or is that throughout the building?

DR. KING: No, just in our lab.

MS. ULLRICH: Okay.

DR. KING: I don't know -- the people are concerned over there as to what the ramifications might be for that, but there hasn't been any -- I don't know what the MIT people have done in other locations.

MS. ULLRICH: Okay.

DR. KING: I just don't know --

MS. ULLRICH: All right.

DR. KING: -- what they've talked about. I just heard the general alert on the issue, you know, obviously around the building. I think a couple of people -- like Hidde Ploegh I think took -- made a little more secure situation for their isotopes. But I just don't know.

MS. ULLRICH: Typically, how often did you see them come through your laboratory before this?

DR. KING: Well, they come through once a week, you know.

MS. ULLRICH: Do they?

DR. KING: And sometimes more, depending on

what they have to do. But they come through and survey the lab routinely, you know, and point anything out to me that needs to be corrected, you know.

MS. ULLRICH: Okay.

DR. KING: And then if they have to come over for pickup or stuff like that, there's several people involved in that process.

MS. ULLRICH: Okay. Now, this particular contamination was far higher than you normally would see. Have you had any other incidents like this that you can recall?

DR. KING: No.

MS. ULLRICH: Or any spills or other kinds of contamination incidents in your lab?

DR. KING: Not since I've been there. I don't know what might have happened before, but not --

MS. ULLRICH: Sure.

DR. KING: I understand the lab was on probation before I got there. I mean, just -- I think because of sort of general clutter, you know.

MS. ULLRICH: Okay.

DR. KING: It's such a crowded place, and the people -- these people are working so much that they really don't care that much about how -- neatness. You know, it's just -- it's just part of the whole thing. I mean, there's

no time to be neat.

But in terms of their efficiency and knowing what they're doing, that is something that people on the outside don't necessarily see. But it's pretty -- it's good. I don't know what, before I came, might have happened. But since I came, there has been -- it has been pretty routine.

Isotope-wise, it's a very routine lab. There's not -- they don't -- there's no big deal stuff there at all. I mean, they've made probes, you know.

MS. ULLRICH: And just to kind of put his use in perspective, what is your standing order every week? Are you ordering one millicurie, 10 millicuries a week? How much is --

DR. KING: Well, as I --

MS. ULLRICH: -- being used in the lab?

DR. KING: We order one millicurie of CDP, and then every other week we get --

MS. ULLRICH: Okay.

DR. KING: -- a millicurie of each, so two.

MS. ULLRICH: Okay.

DR. KING: And then we go above that, if a lot of people are working. People usually flag to me that we need more. Like the -- in that particular month, it's a busy month in the summer for research. That particular

month I did have extra -- I had ordered extra isotope, so we had a few weeks there we had a pretty large quantity.

MS. ULLRICH: Okay.

DR. KING: But not -- not that big -- you know, an extra three vials or something.

MS. ULLRICH: Okay.

DR. KING: You know.

MS. ULLRICH: That's a good --

DR. KING: Yeah.

MS. ULLRICH: -- gives me a good sense of --

DR. KING: And we have residual stuff that's decaying, you know, that we -- that hangs around for a while. But, you know, after a week, nobody cares about --

MS. ULLRICH: Right.

DR. KING: So we just sort of -- I keep it sort of separate and it decays.

MS. ULLRICH: Okay.

DR. KING: So it's pretty routine.

MS. ULLRICH: Sure. Okay.

CHIEF INTERVIEWER ROBINSON: When you went back to July, or whenever your starting point was for the -- for your inventory, what you did, how did you determine how much you had on hand at that point?

DR. KING: Well, we do log in what comes in. I mean, I --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: So we know each week that we received a vial or two, or whatever. That's recorded, you know, so we have -- we know that.

CHIEF INTERVIEWER ROBINSON: Right.

DR. KING: And then as far as usage, usage is sort of the weakest link in this whole business, because of -- well, disposal is too, but there is a system that's -- you know, you're supposed to sign out for disposal.

You're supposed to sign out for a lot of -- for usage as well, but the whole thing is based on the investigators -- how -- how good they are at that, how faithful they are. In general, it's not -- it's kind of hard to get any kind of accurate -- accurate read on that.

The way I did the usage was to go and actually ask people, which is more accurate.

CHIEF INTERVIEWER ROBINSON: Right.

DR. KING: But it is retrospective.

CHIEF INTERVIEWER ROBINSON: And I recognize, you know, you -- you've become -- you're aware of how much you receive starting at any given week.

DR. KING: Yeah. But --

CHIEF INTERVIEWER ROBINSON: I guess my question was, how much did you know was on hand at that point, before you received it? Do you understand my

distinction there? In other words, yeah, your order -- you've got a standing order --

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: -- for two vials every other week, or something like that. How did you determine what was actually in the cabinet on hand --

DR. KING: Before starting --

CHIEF INTERVIEWER ROBINSON: -- at your starting point?

DR. KING: At the starting point. I didn't really determine that myself, although routinely we -- as we order, we have to put an estimate of what we've got in stock.

CHIEF INTERVIEWER ROBINSON: Oh, okay.

DR. KING: Of course, you know, a lot of the stuff is decaying. You know, some of it might be from two or three months or earlier, with tiny amounts, residual amounts left, and that sort of thing. So I make an estimate of what I have on hand, which is usually from half a millicurie to, you know, maybe one and a half or some, whatever -- three.

And I'm usually aware, if I've got a large inventory. Like when I make extra orders, I know that I've got an excess of stuff, you know.

CHIEF INTERVIEWER ROBINSON: How often do you

do -- I mean, did you just kind of take a look and -- once a week and see if you're starting to run a little bit low?

DR. KING: Yeah. Well, as I say, I mean, the way we've got it set up, most times it's used up, and the need is usually to add more, you know.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Once in a while, if they have a slow week, you've got a vial that makes it -- that doesn't -- you know, it doesn't get used. But the decay on P-32 is so fast that, you know, after a few weeks I don't really think about it.

CHIEF INTERVIEWER ROBINSON: So usually you run out of it.

DR. KING: Yeah.

CHIEF INTERVIEWER ROBINSON: As opposed to having to dispose of decayed stuff.

DR. KING: Usually, I run out. And if people are anticipating it, they come to me and say, "We need a couple more vials next week." And then I'll order that.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: That's the way it works. I try not to have excess, because I don't want to spend any more --

CHIEF INTERVIEWER ROBINSON: Anything more?

MS. ULLRICH: No, I don't have anything else.

CHIEF INTERVIEWER ROBINSON: John?

TEAM LEADER GLENN: Just a little bit about the security in the lab.

DR. KING: Yeah.

TEAM LEADER GLENN: One thing I was wondering about, you know, after we did the tour yesterday, it looks like it would be almost impossible to lock the laboratory. So I guess --

DR. KING: It's not. It's not really. I mean, it's just that the people are in there a lot.

TEAM LEADER GLENN: Yeah. So I guess my question is, are there any times when there's no one in there that -- if there are times like that, is it locked?

DR. KING: It's generally -- yeah. What we try to do is since -- we have a fairly large population of women in the lab, and the Cancer Center does have petty thefts occasionally, because you can access the building through the stairwells. They don't really have a good central locking setup, although they do lock the buildings after a certain hour.

But we've had things in the middle of the day happen when there's -- everybody is there, so not -- not so much in our lab, but there was one that hit a -- lab not too long ago. Somebody just walked in and took a computer right at 2:00 in the afternoon.

So what we do at night -- since -- and

particularly since there are a lot of women in the lab working, sometimes until 3:00 in the morning or something, we make sure that the peripheral doors at least -- you know, all of the perimeter is closed. I mean, and there are quite a few doors.

The office door usually gets locked the earliest probably. The one to -- from entering from the hall into Sosumo's area, because the secretaries and even he will leave reasonably early. And although he is there fairly late sometimes, but that door gets locked, because we have computers and stuff up there.

And then we -- that whole corridor next to Building 18 gets closed first because it's the least active. The back corridor has got people going in and out all the time, so that's one of the last to get closed down. But that ultimately -- you know, when I walk out, I usually walk -- do a walkthrough. And if there's only a couple of people in there, I will lock that door. I will tell them, I'll say, "I'm -- you know, I'm -- you're the only person left. I'm locking the door, you know, when I go out." And then I always check the computer room, because that's sort of off by itself in the --

TEAM LEADER GLENN: Okay. But it would be the policy, then, that if you're leaving the lab unattended, that it would be locked?

DR. KING: There's a policy for it, and we, in fact, do that in the evening time. But there are always times that, obviously, later in the day that --

TEAM LEADER GLENN: You may have already answered my next question. And that would be, would there be an opportunity for someone, you know, to come into the lab and perhaps put something in food that was stored in the refrigerator or something like that?

DR. KING: Yeah.

TEAM LEADER GLENN: But if it had --

DR. KING: I think there is --

TEAM LEADER GLENN: -- had that opportunity.

DR. KING: Well, the refrigerator in question, you know, is in a place that's kind of vulnerable. It's vulnerable, and it's not vulnerable. It's right close to Sosumo's office actually. It's in the front where the xerox and all of that is, and people have to come and get that food and go all of the way back around to the conference room to eat it.

So if nobody was in those front offices, you could easily, you know, come in, take something out of the refrigerator and leave, and nobody would see you at any -- in a given timeframe, I suppose. Or if you were a stranger, it seems like it would be a lot harder because somebody would notice, but -- so that -- that area is kind

of vulnerable I guess. And, particularly, I learned that you -- that Yuguing had left his food overnight in that refrigerator. So --

TEAM LEADER GLENN: What about drinking beverages? Does any of that occur in the laboratory? Sodas? Coffee?

DR. KING: They're not supposed to, you know. People obviously violate that kind of stuff, and they get reprimanded for it. But occasionally, you know, or they -- people will walk through -- you know, find somebody on their way taking a shortcut and yell at them, or whatever.

TEAM LEADER GLENN: So none of the researchers -- I mean, even drinking water, like a glass of water?

DR. KING: No, no, no. I mean, that's against the rules.

TEAM LEADER GLENN: Oh, is it?

DR. KING: Absolutely.

TEAM LEADER GLENN: To drink a glass of water in the lab?

DR. KING: Any kind of food in the lab is --

TEAM LEADER GLENN: Okay.

DR. KING: -- you know, that's their official line that -- any place in the country you go.

TEAM LEADER GLENN: So you all have to go to the lounge. You go to the refrigerator and then you go

to --

DR. KING: The refrigerator is out in the front, and we -- there used to be a conference room in the front. That's why the refrigerator is out there where people would eat, but now it's around on the other side. But it's a common one, so we can't put our refrigerator back there. It's kind of a cumbersome thing. But, yeah, they're not supposed to have --

TEAM LEADER GLENN: A lot of the researchers bring in their lunches and leave them in that refrigerator and bring their meals or just --

DR. KING: There's a certain core of people that do that, you know, including Yuguing. And there's some people that eat this -- some of the -- there are several Japanese post-docs and a few Chinese, they are routine about that. They keep their food in there, and then they bring it in and -- and microwave and eat it, or whatever, you know.

TEAM LEADER GLENN: And just one more thing, and I'll let you get back to your --

DR. KING: Get back to --

(Laughter.)

TEAM LEADER GLENN: It wouldn't be -- if, say, one of the researchers were to take one of the vials out of the refrigerator that you showed me yesterday where they're

keeping the nuclide --

DR. KING: Yeah.

TEAM LEADER GLENN: -- the isotopes, it would be very easy for them to unnoticeably walk out to the other food refrigerator and -- I mean, especially if they normally kept their food in the refrigerator, and just pour some of that vial on our -- on some food.

DR. KING: Well, it wouldn't be easy to pour it. I mean, it --

TEAM LEADER GLENN: Okay.

DR. KING: The problem with that whole scenario -- I mean, it's -- certainly, they would not be noticed if they routinely went to that refrigerator. Or even if they didn't routinely, nobody would pay much attention if they went to get the food out, you know. They could just walk out the front door, and nobody would say anything, you know.

To put isotope on there, unless they had some -- the problem is it's -- even -- the amount he had is large, and people would recognize it. But in a layperson's term, it's still a drop. I mean it's not -- it's not a lot, and it really is not an easy thing to dispense. I mean, you know, you'd have to -- the way we do it is with a specialized pipette. It has a very fine tip, and, you know, you have to press it out with air for it -- and it

comes out as a little drop.

So you certainly couldn't do that. You couldn't come to that refrigerator and do that, so you'd have to take the food --

TEAM LEADER GLENN: Well, if you were trying to conceal a pipette with some drops on it --

DR. KING: I don't think it would -- I think that would -- in this -- it's possible, but that is such a public area.

TEAM LEADER GLENN: Okay.

DR. KING: And the procedure of doing it is so conspicuous, if you've got a pipette.

TEAM LEADER GLENN: Okay.

DR. KING: The only other thing you can think of is that the drop was put on some sort of little -- some sort of little frame and somebody went in there and just sort of poked it around or something like that. But to actually dispense that drop, it's -- it's -- you have to have something that can handle that kind of volume peacefully.

TEAM LEADER GLENN: Okay.

DR. KING: You know, it certainly could be done, but I'm -- my guess, if you really wanted to do something like that, you would take the food some place and doctor it, and then bring it back, or something.

Now, Yuguing, I think he actually wraps his -- his container is wrapped in --

TEAM LEADER GLENN: Plastic?

DR. KING: -- plastic, and he has a piece of fruit. Now, that's another potential. We discussed the fruit could be injected. A small item like that could be injected as well with isotope. That's another means. You could actually take a little syringe and --

TEAM LEADER GLENN: Actually, that kind of gets back to one of the other areas. You mentioned sharps, I think, at one point.

DR. KING: Well, that's what --

TEAM LEADER GLENN: Are syringes used? And then, are there contaminated --

DR. KING: Yeah.

TEAM LEADER GLENN: -- needles around?

DR. KING: Yeah. We have sharp containers especially for that purpose, and that we came -- we were going over this kind of thing, and somebody said, "Well, let's check the -- I think Phil Sharp actually is the one that suggested, why don't you check the sharp container, because you wouldn't normally expect it in there. But if it -- that much activity, if it was on a needle, you could pick it up. So Mitch and I went through all of the containers and --

TEAM LEADER GLENN: Do you have a policy on needle sticks, and that kind of thing? If somebody did get stuck, would they report it?

DR. KING: Well, there's certainly a big policy on sharps campus-wide, because their custodial service is really -- I worry about that. So --

TEAM LEADER GLENN: But I guess you don't --

DR. KING: But the people in the lab, I don't know if anybody would pay, you know -- unless they knew that -- people don't usually worry about it unless they know there is something to worry about, you know.

MS. ULLRICH: It depends on what they're working with.

DR. KING: Yeah. I mean, you know, if you were working with, you know --

MS. ULLRICH: Working with a virus --

DR. KING: You'd definitely do something about it, but -- so people know what they're doing. Most of our concern is for the custodial people, and that sort of thing, that they don't run into any kind of problems, because some of that stuff does have nasty stuff on it.

TEAM LEADER GLENN: Yeah. Was there any type of routine bioassay program in the laboratory, urinalysis, that sort of thing? Or was it only in --

DR. KING: No. We did -- they did that. That

was one of the other things they did early on is to check everyone's urine, because they -- because of the thing at NIH, they were worried about the water cooler, so they checked everybody out. Or everybody was offered that.

TEAM LEADER GLENN: Yeah. The incident at NIH, is that an incident that there was general knowledge of in the lab?

DR. KING: When it happened?

TEAM LEADER GLENN: Yeah.

DR. KING: My only -- my only -- I mean, I'm sure it was disseminated very rapidly through E-mail.

TEAM LEADER GLENN: Yeah.

(Laughter.)

DR. KING: The rumor mill definitely I -- I got feed -- the kind of feedback that told me that everybody sort of was hearing about it. And so officially, I mean, like I say, I was trying to go through the steps to make sure that MIT people sort of knew exactly -- not just rumor -- I mean, the rumor mill really distorts everything, so I -- I told them what I thought -- where things were and gave them an accurate picture.

Other than that --

TEAM LEADER GLENN: My last question is, has there ever been complaints from people about, you know, somebody has been eating their food? Taking their food out

of the refrigerator? Any complaints along those lines?

DR. KING: No. I can't -- that usually happens in places, too. Somebody drank my milk. Somebody used it for coffee or -- I've never heard anything surrounding that type of thing. I mean, we have been worried about Sosumo and that refrigerator, that somebody -- because of these mail bombings -- I mean, he is a Nobel laureate, the whole security thing with him is an issue, and that refrigerator being next to his office, I mean, I -- you know, we don't know -- that still is one of the theories that somebody might have actually meant that for him, you know.

TEAM LEADER GLENN: Okay.

DR. KING: Just thinking that perhaps, you know, they would -- they would come in and contaminate his food, because he does eat in his office a lot. So --

TEAM LEADER GLENN: Since you raised that, if someone other than one of the regular laboratory people were to be found inside the lab, what would be the reaction to the people who work there?

DR. KING: It would sort of depend -- I mean, if they were -- had suits on, they'd think they were salesmen, you know. If they hung around very long, somebody would say, "Hey, can I help you?" You know, it's that kind of -- they would certainly notice, because the place is so crowded, and there's usually -- it's usually

pretty obvious what they are. They are repair guys, or they're salesmen, or -- so it's -- and then, if they're in lay clothes, I mean, they usually break down into students or collaborators or a certain group of friends that come by, or whatever, you know.

So, I mean, a real -- a totally strange person would be noticed, you know, and maybe somebody would say that --

TEAM LEADER GLENN: Then --

DR. KING: It's a tense place, in that regard. I mean, it's --

TEAM LEADER GLENN: You don't recall any strangers being noted during this timeframe?

DR. KING: No. The only thing -- the weird thing that happened to me, though, is that Hidde Ploegh's secretary --

CHIEF INTERVIEWER ROBINSON: Whose?

DR. KING: Hidde Ploegh, it's the next lab -- it's the lab on our corridor, third floor.

CHIEF INTERVIEWER ROBINSON: Hidde Ploegh?

DR. KING: Hidde Ploegh.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: Yeah. He is a Dutch guy. His secretary came up to me -- I forget when. I think it was that first -- maybe the first day that it came up, when I

talked to Yuguing. But certainly, that first week she said, "Is there anybody -- is there some sleazy guy, Chinese guy in your lab?" I said, "What?" You know, she said, "Well," she said, "I was down in the mail room, downstairs, to get the mail and some -- there was a strange -- a sleazy Chinese guy that was looking in your mailbox -- in Sosumo's mailbox," you know.

And when she went in there she said he took off in a suspicious sort of way, you know, and I said, "Well, that's strange." And, of course, so the secretaries particularly are worried about the mail --

CHIEF INTERVIEWER ROBINSON: Yeah.

DR. KING: -- things, you know. And she was serious about it. I sort of laughed at it at first, but -- and she -- I think she did report it at the time. But it just sort of was one of those things that seemed -- nothing more came of it, but that was the only -- that was sort of a weird thing that happened then at that particular time, in terms of strangers. But other than that, there was nothing noticeable.

CHIEF INTERVIEWER ROBINSON: Gregg, do you have anything else?

MR. GONECONTO: Just a couple of quick questions. Do you know if like in the last six months or so that -- whether or not Mr. Lee has been having any

personal problems that you know of?

DR. KING: No. You know, in fact, things seem to be going pretty good for him. I mean, he got -- I mean, in academic terms, getting a faculty position some place is a major event in somebody's life, you would think.

I mean, he's -- like I say, he is not an easy guy to read so to speak. He keeps things on a pretty focused plane. But I think he was feeling pretty good about his job offer and all of that, and he was very busy with that, you know. So I wasn't aware of any kind of --

MR. GONECONTO: Who would you say he is closest to in the lab?

DR. KING: Well, Ming Xu is probably the guy he -- he talks a lot to Ming Xu. I don't know in terms of personally how close they are, but they just -- they talk quite a bit, because -- and they're -- Ming's bench is close to my office, so I -- I observe that quite a bit, you know, that they -- they talk to each other a lot, you know, somewhat on a professional basis I think, but --

MR. GONECONTO: How has this affected his moving to Chicago?

DR. KING: I was just talking to him this morning. You guys had finished with him, actually. He was saying that he would probably have to delay that start there a couple of months, because he can't work for three

months. There is something about a three-month -- I don't know whether it's the -- I don't know. I wasn't really sure why, but he -- it's partly because of this disability thing, or -- he said he couldn't start working for three months.

MR. GONECONTO: Because of this incident?

DR. KING: Yeah. So if he decided to go to -- starting from today, he would have to delay it three months, and so that it would start later than his November start date, which is what originally it was set.

MR. GONECONTO: And what is his status with -- that is, is he on a visa? Or do you know about --

DR. KING: I'm not really sure exactly what his status is at this point, you know. I don't -- I'm not really sure. I would imagine he would have to have a -- a pretty good situation there to get a permanent position at a state university, I would think.

MR. GONECONTO: Right.

DR. KING: You know? I'm not exactly sure.

MR. GONECONTO: I don't have any other questions.

CHIEF INTERVIEWER ROBINSON: Is there anything that we haven't talked about, or any area that we haven't discussed that you think might be important to your understanding of our investigation, or that you'd like to

address?

DR. KING: No, I don't think so. I mean, I think you're almost at the same point we all are at this point. You know, it's -- just to say that it -- and, I mean, I'm really -- the thing that disturbs me the most, obviously, from our standpoint is -- is any sort of accusations that someone -- I mean, the whole premise that someone in the lab did it is the most upsetting thing to us, you know.

First of all, it doesn't -- I mean, I think a lot -- a lot of people feel like it's extremely unlikely, although there are those that might support that. I just don't know what everybody is -- how everybody is going to come down on it. But I think, you know, it's very -- it's a very disrupting thing for our group --

CHIEF INTERVIEWER ROBINSON: What do you think happened?

DR. KING: -- to have to deal with that, you know.

CHIEF INTERVIEWER ROBINSON: What do you think happened? Do you have any theory about it?

DR. KING: I -- I don't know. I mean, I -- it breaks down into a couple of different camps, you know. There's -- some of the more experienced, cynical types, experienced people that have worked with isotopes a long

time, initially felt like he just -- it must have been an accident. Somehow he managed to contaminate himself.

But then, as the -- as the amount began to be more obvious, most people that are experienced realize when you're handling that much isotope you know where it is. You're aware of it, you know, and you -- if it's like five microliters, or something like that, it's -- you could sort of maybe lose that, or you could get it on your finger. It's about that much, it's like a whole pipette. So it stumps them.

You know, they say, "Well, that's -- that doesn't seem likely that it would be an accident." So then you move on to the next theory of --

CHIEF INTERVIEWER ROBINSON: So --

DR. KING: -- who might have done it or --

CHIEF INTERVIEWER ROBINSON: Yeah.

DR. KING: I think the most common thing that I sort of sense is that if it -- if it did happen there at all, and since he had come back into the lab to work, you know, he was actively working with it at the time and it was an accident. Nobody can understand why -- how or why, but they thought it was an accident. And the only thing that really causes a problem with that is the amount.

And there is probably -- there is a few people I think that probably, as you talk to people, might tell

you that they think somebody might have done it, you know. And as far as I can see from my observations, there is no physical evidence that it even happened there. So that's what is really disturbing about it, is it's basically an accusation with no -- the thing at NIH has at least got a cooler, and it's got --

CHIEF INTERVIEWER ROBINSON: Yeah.

DR. KING: This thing is really -- there is no trace. There is no trace anywhere --

CHIEF INTERVIEWER ROBINSON: Yeah.

DR. KING: -- of -- of -- except for his body, so --

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: There's the outside possibility that somebody from the outside might have done it, which hasn't really been considered very much. I think people feel like that's the most -- at least the investigators -- I think there are people in the lab that feel like that's a real possibility.

CHIEF INTERVIEWER ROBINSON: Again, you've got to keep all possibilities open.

Okay. Anything else? Any other comments that you'd like to make?

DR. KING: No. No.

CHIEF INTERVIEWER ROBINSON: Well, we

appreciate your time this afternoon. We -- you know, if we have any additional questions, we may call you back, and you -- I think you know Dr. Glenn's number over here.

DR. KING: Yes.

CHIEF INTERVIEWER ROBINSON: If you've got any afterthoughts that you have after --

DR. KING: Sure.

CHIEF INTERVIEWER ROBINSON: -- after you walk out of here, you can certainly give us a call.

Anyone else have any additional final questions?

MS. ULLRICH: Here's a copy of the document for him.

CHIEF INTERVIEWER ROBINSON: All right. I'll give you a copy -- this is a document that talks about the transcript, and the procedures regarding review of the transcript, etcetera.

DR. KING: Okay.

CHIEF INTERVIEWER ROBINSON: So if you want to -- obviously, like I said at the beginning, if you want to -- if you want to review the transcript for corrections, and take a look at it, you're certainly welcome to do that, and we have an administrative lady that can handle that. And if you -- there will be an errata sheet provided, if you need to make corrections.

DR. KING: Okay.

CHIEF INTERVIEWER ROBINSON: Okay?

DR. KING: Okay.

TEAM LEADER GLENN: I guess just one thing that -- did you make any sort of documentation for the inventory you did? Did you write a memo?

DR. KING: Yeah, I did. Well, I didn't write a memo. I gave a -- Yuguing asked me to send him a -- I had the estimate up to a certain date there. I gave a copy to Don over here, and Yuguing called me before he went to the police and said that he wanted a copy of it for himself to take to them. So those --

TEAM LEADER GLENN: How could I describe that? I think that's probably a document I'll request that the Radiation Safety Office provide to us.

DR. KING: I would say it's an estimate of usage --

TEAM LEADER GLENN: Okay.

DR. KING: -- report.

CHIEF INTERVIEWER ROBINSON: Is that --

DR. KING: It's not a --

CHIEF INTERVIEWER ROBINSON: -- addressed from you to the office, or how is that -- in what form is it taken?

DR. KING: It's hand-done, and it's a xerox

given to Don and Yuguing.

CHIEF INTERVIEWER ROBINSON: Okay.

DR. KING: No, I would put in a word for the guys over here. I feel like they -- just for the record, I think they -- they've tried as hard as they can to deal with this -- a very, you know, obviously, confusing, difficult thing, the whole business. And, you know, I don't really have -- I personally don't have any -- well, I can't see much fault in their -- their activity.

CHIEF INTERVIEWER ROBINSON: Okay. So noted.

DR. KING: Yeah. Okay.

CHIEF INTERVIEWER ROBINSON: It's now 4:27 p.m., and this interview is completed. Thank you very much.

DR. KING: Okay.

CHIEF INTERVIEWER ROBINSON: Appreciate it.

(Whereupon, at 4:29 p.m., the interview was concluded.)

C E R T I F I C A T E

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: INTERVIEW WITH DENNIS KING

Docket Number: --

Place of Proceeding: Cambridge, Massachusetts

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

_____

K. Wood
Official Reporter
Neal R. Gross and Co., Inc.

10-95-34

Tonegawa Lab ~~Isotope~~ 9/1/95
Inventory / Distribution Plan

Inventory / Distribution Officers - Dr. Dennis King - Lab Manager
Shu Ying Huang - Senior Technician
Dr. Toshikuni Sasaoka - Post Doc

Officers will be responsible for inventory management according to the following procedures.

(1) Items received will be logged into an inventory log sheet and stored in a locked box in -20°C freezer in room 347 Bld E17.
Only the above mentioned officers will have keys.

Inventory log sheet : (Kept ~~by~~ Dennis King in room 342)

Date rec'd	Vendor	Item Description	Lot#	Sp. Ac	Total

(2) Items will be dispensed to authorized users using the following request log (Kept by Dennis Kin in 342)

Date	Names	Item Requested	Quantity ul	ul	Purpose	approx Date of use	approx Date of Disp

Environmental
Medical
Service

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MEDICAL DEPARTMENT
77 MASSACHUSETTS AVENUE, 20B-238
CAMBRIDGE, MASSACHUSETTS 02139-4307

RADIATION PROTECTION OFFICE

To : File
From : Donald Haes, Assistant Radiation Protection Officer
Subject : Prof. Tonegawa Lab P-32 Inventory Assessment
Date : September 12, 1995

On Tuesday, 8/22/95, the Radiation Protection Office removed all stock vials of P-32 from Professor Tonegawa's laboratories. This was the result of the ongoing investigation of the P-32 internal contamination of a researcher. Dennis King, Laboratory Safety Manager for Professor Tonegawa's lab, was asked by the Radiation Protection Office to perform an inventory assessment for P-32 for the time period of 7/31 - 8/22/95 (see attachment A). The conclusion of this inventory assessment indicated that 7 vials of P-32 were received in that period, containing 700 μl of P-32. RPO records verify that amount.

All P-32 was accounted for with the exception of approximately 51.7μl.. Of this volume, 37 μl can be traced to the vial received 8/14/95. This vial contained 1.00 mCi of P-32 with a calibration date of 8/19/95. The unaccounted volume of activity then represents 473 μCi of P-32 on 8/14/95.

In addition, all radioactive waste was removed, segregated, and marked. A search of the waste resulted in the retrieval of the vial in question. The vial was carefully removed from the waste stream, and is currently isolated.

Director
20B-238
(617) 253-5360
Fax: (617) 253-4879

Biosafety Office
20C-214
(617) 253-1740
Fax: (617) 253-4879

Industrial Hygiene
20C-204
(617) 253-2596
Fax: (617) 253-4879

Radiation Protection
Campus RPO 20C-207
(617) 253-2180
Fax: (617) 253-4879

Reactor RPO
NW12-108
(617) 253-4203
(617) 252-1533

Bates LINAC C/O
P.O. Box 95 21 Manning Road
Middletown, MA
(617) 253-9217 Fax: (617) 253-9599

Attachment A

8/31/95

Radioisotope Log for Aug 95 (7/31 - 8/19)

Total Rec'd - 7/31 - 8/19 = 700 µl (7 vials - 100µl each)
µ = microliters

Lab used - 538.3 µl
unused ≅ 100 µl (8/5)
(RPO) 10 µl (8/12)

648.3 µl

700 µl Total
648.3 used + unused
51.7 unaccounted

51.7 × 10 µCi/1 = 517 µCi

Vial 8/19 - 100 µl total
(Rec'd 8/14) 63 µl used - Patrick, Ken, Haydn
37 µl ~~unaccounted~~ unaccounted

note: Haydn used up last 7 µl and discarded on 8/16

µCi est.

37 × 12.5 µCi. = 462.5 µCi

10-95-35

TONEGAWA RADIATION USERS

Name	Room	Phone	Title	Dept
Ashton-Rickardt, Philip	E17-347	3-8762	PDA	CCR
Bandeira, Antonio	E17-342	3-6439	Visiting Scientist	CCR
* Chen, Chong	E17-358	3-2276	HHMI PDA	CCR
Chen, Dong Feng	E17-347	3-8762	PDA	CCR
Cho, Michael	E17-347	3-8762	UROP	CCR
Delaney, Joe	E17-347	3-8762	Grad	CCR
Ebralidze, Alex	E17-346	3-7406	PDA	CCR
Gerber, David	E17-346	3-7406	Grad	CCR
Graziadei, Linda	E17-350	3-6522	PDF	CCR
Hasan, Mazahir	E17-346	3-7406	HHMI PDA	CCR
Hinds, Heather	E17-350	3-6522	Grad	CCR
Hsu, Albert	E17-360	3-6551	UROP	CCR
Huang, Josh	E17-358	3-6551	PDF	CCR
Huang, Shu Ying	E17-347	3-8762	Tech Assoc	CCR
Iwasato, Takuji	E17-350	3-6522	PDF	CCR
Lafaille, Juan	E17-360	3-6551	HHMI PDA	CCR
Levelt, Christiaan	E17-358	3-6551	PDF	CCR
Li, Yuqing	E17-347	3-8762	PDA	CCR
Lim, Dina	E17-342	3-6439	Tech Asst	CCR
* Lovett, Chanel W.L.	E17-342	3-6439	HHMI Tech	CCR
Marusic-Galesic, Suzanna	E17-357	3-6551	HHMI PDA	CCR
Poss, Ken	E17-346	3-7406	Grad	CCR
Prosser, Haydn	E17-342	3-6439	PDA	CCR
Qian, Zhuo	E17-360	3-6551	PDA	CCR
Sasaoka, Toshikuni	E17-350	3-6522	PDF	CCR
Shen, Jie	E17-347	3-8762	PDA	CCR
* Van de Keere, Fabienne	E17-360	3-6551	HHMI Tech	CCR
Wang, Yanyan	E17-358	3-2276	PDF	CCR

* PROPOSED RADIATION WORKERS, NOT YET TRAINED

TONEGAWA RADIATION USERS

Name	Room	Phone	Title	Dept
Wu, Min	E17-342	3-6439	PDA	CCR
Xu, Ming	E17-342	3-6439	PDA	CCR
Zacks, Rebecca	E17-342	3-6439	Tech Asst	CCR

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 10/3/90

1. Name ASHTON-RICKARDT PHILIP G (Last (Print) First M.I.) Birth Date 8/20/6[illegible]
2. Social Security Number ——— Faculty Title SCIENCE
3. Department CENTER FOR CANCER RESEARCH Staff Title RESEARCH FELLO[illegible]
4. Office No. E17-347 Ext. 6459 Job Title ———
5. Lab. No. E17-347 Ext. 6459 Student ——— Year: ———
6. Project Supervisor SUSUMU TONEGAWA
7. Brief description of present work with radiation:

MAKING RADIOACTIVELY LABELLED NUCLEIC ACID PROBES (P^{32})

DNA SEQUENCING (S^{35})

8. Principal radioactive material to be used in your present work: P^{32}/S^{35}

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amou to be used per experiement
P^{32}	1	dCTP (liquid)	~50uCi
S^{35}	1	dATP (liquid)	~20uCi

9. Radiation producing equipment to be used in your present work:

Type: ——— Maximum energy ———

AUTHORIZATION # CCR-M-3
SUPERVISOR TONEGAWA
RPO STAFF D. Hayes

FILM BADGE # 65408
SERIES CODE 841
TERMINATION DATE ———

LAST NAME ASHTON-RICKARDT

ASHTON-RICKARDT, Philip G.

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		P^{32}	S^{35}	I^{125}					
Largest quantity handled	0.5 ~~mCi~~	0.5 mCi	0.5 mCi	0.5 mCi					

Name and Addresses of Employers	Dates	
	From	To
EDINBURGH UNIVERSITY, MEDICAL SCHOOL EDINBURGH EH8 9AG	06-88	09-90

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?	~~✓~~	✓	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		✓	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

PINK 4

	a.	b.	c.	d.	e.
1.		✓			
2.		✓	✓		
3.		✓	✓		
4.		✓	✓		
5.		✓	✓		
6.			✓		
7.		✓	✓		
8.		✓		✓	
9.		✓		✓	
10.		✓			
11.				✓	
12.			~~✓~~	✓	
13.	✓				
~~14.~~	✓			✓	
15.		✓		✓	
16.		✓			
17.			✓		

18. TIME DISTANCE SHIELDING

19. THYROID USE BN IODINE (KCl)

20. 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 10/5/90

(b) Type of Interiew: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: TONEGAWA

(e) Authorization Reference: CCR-M-3

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body _____ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated 8/1/91

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

P. G. Ashton-Richardt 10/5/90

Signature Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FOR OFFICE USE ONLY:

LAST

AUTHORIZATION # CCR-m

SUPERVISOR S. Tonegawa

RPO STAFF D. Hayes

FILM BADGE # 105589

SERIES CODE 6-11

TERMINATION DATE

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 1.13.94

1. Name BANDEIRA FERREIRA ANTÓNIO
(Print) Last First M.I.

2. Social Security Number 026-76-1617 Birth Date 12.29.55

3. Department CCR Supervisor Tonegawa

4. Faculty — Staff — Student — Other —

Title visiting scientist

5. Office No. — Ext. 6439 Lab No. E17-342 Ext. ____

6. Project Supervisor Tonegawa

7. Brief description of present work with radiation:

- Cell cycle analysis
- ^{51}Cr-release assays.
- cell irradiation with Cobalt

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{3}H-Thymidine	5mCi	liquid	1mCi
^{51}Cr	5mCi	liquid	1mCi

9. Radiation producing equipment to be used in your present work:

Type — γ-cell irradiator Maximum energy 83rads/mn.

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{3}H-Thym.	^{51}Cr.				
GREATEST ACTIVITY USED	5mCi 25+mCi	5mCi				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Medical school Lisbon PORTUGAL Umeå University Umeå Sweden PASTEUR INSTITUT PARIS FRANCE					1979	1993

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO
γ-irradiator	PASTEUR INSTITUT 25, Rue du Dr. ROUX 75015 PARIS	1982	1993

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

António [illegible]

Signature

1.13.94

Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hass Date 1/13/94

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: CCR-M Supervisor: S. TOVETAWA

Date Terminated: 8/1/94 Date Reactivated: _____

Film Badge: Yes ✓ No _____ : Body ✓ Wrist _____ Finger _____

Spare Badge # 04010 Reference # 6952240 Issue Date 1/25/94 Termination Date 8/1/94

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No ✓ :

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

8/20/20

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. c.
2. b.
3. e.
4. b.
5. c.
6. c.
7. GM NaI
8. a
9. c. d
10. a
11. a. d
12. c.
13. b. d
14. a b e. CAB
15. c.
16. b.
17. b.
18. Time, distance shielding.
19. Thyroid
20. 100

FOR OFFICE USE ONLY

LAST NAME

AUTHORIZATION # 9-I

SUPERVISOR Thaveri/Schneider

RPO STAFF REILLY

FILM BADGE # 4M

SERIES CODE B41

TERMINATION DATE

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 12-14-93

1. Name CHEN DONG FENG
   (Print) Last First M.I.
2. Social Security Number 405-29-5781 Birth Date 10-12-63
3. Department Brain and Cognitive Sci. Supervisor Dr. Gerald E. Schneider
4. Faculty _____ Staff _____ Student _____ Other _____
   Title Postdoc. Associate
5. Office No. E25-634A Ext. 3-5717 Lab No. _____ Ext. 3-5717
6. Project Supervisor Dr. Gerald E. Schneider
7. Brief description of present work with radiation:

   To be used for in situ hybridization

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{35}S	20 mCi	Radioactive CTP	500 uCi

9. Radiation producing equipment to be used in your present work:

   Type _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{14}C	^{3}H	^{32}P			
GREATEST ACTIVITY USED						
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Dr. Fred J Roisen Dept of Anatomical Sci and Neurobiology School of Medicine, Univ. of Louisville Louisville KY 40292					10-1986	2-1992

2. Previous experience with radiation producing equipment.

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

12-17-93
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: Judith Reilly Date 12/17/93

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: 9-I Supervisor: Shawn Schaefer

Date Terminated: _____ Date Reactivated: _____

Film Badge: Yes _____ No ✓ : Body _____ Wrist _____ Finger _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No ✓ :

Urinalysis _____ Radionuclide _____

In vivo Measurements: Whole Body _____ Thyroid _____

7090

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. b
2. c
3. b
4. c
5. X
6. c
7. c
8. c
9. d
10. a
11. ~~a~~
12. d
13. a
14. d
15. d
16. d
17. b
18. Wear Lab coat, gloves. No Food, drink in the lab.
19. ~~19.~~
20. 3-2180, 3-2360 during work hour, dial 100 after work hour

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 5-26-93

1. Name Cho Michael
   Last (Print) First M.I.
   Birth Date 07-16-76
2. Social Security Number 626-20-1802
   Faculty Title
3. Department Biology / Whitaker College
   Staff Title
4. Office No. Ext.
   Job Title UROP'er
5. Lab. No. E25-438 Ext. 253-7683
   Student MIT Year: '96
6. Project Supervisor ~~Kim Farrell Stellar~~ Tonegawa
7. Brief description of present work with radiation:

   Working with sequencing gels

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiement
P32 / S35	1 mCi	liquid	100 ~~uCi~~ uCi

9. Radiation producing equipment to be used in your present work:

   Type: Maximum energy

FOR RPO USE ONLY

LAST TLD EXCHANGE

AUTHORIZATION # CCR-m

SUPERVISOR Stellar-Tonegawa

RPO STAFF Bill Irwin

FILM BADGE # 06402

SERIES CODE 867

TERMINATION DATE 1/4/93

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled									
Largest quantity handled									

Name and Addresses of Employers	Dates	
	From	To

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?			
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?			

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

90%.

	a.	b.	c.	d.	e.
1.		✓			
2.			✓		
3.		✓			
4.			✓		
5.		✓			
6.			✓		
7.			✓		
8.		✓			
9.				✓	
10.		✓			
11.				✓	
12.				✓	
13.	✓				
✗14.	✓				
✗15.		✓			
16.		✓			
17.			✓		

18. shielding, time, distance

19. thyroid gland... most under head due to ability of I-125 (uranium)

20. 3-2100 or 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by William Irwin Date 6/4/93

(b) Type of Interview: Radioisotope ✓ Laser ____ X-Ray ____ Reactor ____ Accelerator ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual ____

Regulatory Guides 8.13 and 8.29 ✓ Other ____

(d) Supervisor for radiation protection training: Steller

(e) Authorization Reference: 9-6

Because a miner on 6/4/93

(Note: Interviewer will circle Yes or No for each item below) SPARE 0706556D/C9

(f) (Yes) No) *Badge: Body ✓ Wrist ____ Finger ____ Badge # ____

Dates monitoring badge issued ____, terminated 9/30/93

(g) (Yes, (No) Bioassays: Urinalysis ____ Radionuclides ____

In Vivo Measurements: Whole Body ____

Thyroid ____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Signature ____ Date 6/4/93.

Environmental
Medical
Service

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MEDICAL DEPARTMENT
77 MASSACHUSETTS AVENUE, 20B-238
CAMBRIDGE, MASSACHUSETTS 02139-4307

RADIATION PROTECTION OFFICE

TO: Parent or Legal Guardian

FROM: M. Galanek, Associate Radiation Protection Officer

SUBJECT: Dependent Minor Lab Work

DATE: June 4, 1993

Dear Parent or Guardian:

Michael Cho will be performing work at MIT which will require their presence in a laboratory in which small amounts of radioactive material are handled. All of the workers in the laboratory have been trained in the safe handling of radioactive materials by members of the MIT Radiation Protection Office.

MIT is licensed by the Nuclear Regulatory Commission to possess and use radioactive material in basic research. All radiation workers are required to attend a radiation safety training seminar prior to beginning work with radioactive materials. The subjects covered during the seminar are safe handling techniques, radiation units, dose units, radiation detection, maximum permissible exposure limits, potential biological effects from exposures to radiation, waste disposal techniques, radiation survey techniques, contamination monitoring and control, emergency procedures, applicable federal and state regulations, radiation exposure monitoring, natural background exposure levels, and other topics specific to the work being performed in the laboratories. All radiation workers are required to pass a quiz at the end of the seminar to demonstrate their understanding of the subject matter.

Radiation workers involved in the type of work your daughter/son will be performing do not typically receive significant radiation exposure due to their work. (Average exposures for all radiation workers at MIT are less than 5% of the permissible levels). However, their exposures will be carefully monitored to assure they are kept as low as practical.

Your signature below acknowledges your awareness of this work and indicates your permission for the student to work in a radiation laboratory. If you have any questions, please feel free to call me at (617) 253-2180.

Signature of Parent or Guardian

Director
20B-238
(617) 253-5360
Fax: (617) 253-4879

Biohazard Assessment
20C-214
(617) 253-1740
Fax: (617) 258-6107

Industrial Hygiene
20C-204
(617) 253-2596
Fax: (617) 253-4879

Radiation Protection
Campus RPO 20C-207
(617) 253-2180
Fax: (617) 253-4879

Reactor RPO
NW12-108
(617) 253-4203

Bates LINAC RPO
P.O. Box 95 21 Manning Road
Middleton, MA
(617) 245-6600 Fax: (617) 245-0901

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised: 12/88

FILM BADGE # 06338
SERIES CODE 54
TERMINATION DATE
AUTHORIZATION # CCR-11
SUPERVISOR S. Tonegawa
RPO STAFF D. Hess
FOR O[redacted]
LAST N[redacted]

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 4/22/93

1. Name Dekaney (Last) Joseph (First) R (M.I.) Birth Date 12/17/64
2. Social Security Number 143-66-2225 Faculty Title
3. Department CCR Staff Title
4. Office No. E17 353 Ext. 3-6461 Job Title
5. Lab. No. E17 347 Ext. 3-8762 Student Year: Grad
6. Project Supervisor Dr. Susumu Tonegawa
7. Brief description of present work with radiation:

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amou to be used per experiement

9. Radiation producing equipment to be used in your present work:

Type: _____ _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		P^{32}	S^{35}						
Largest quantity handled		20uCi	10uCi						

Name and Addresses of Employers	Dates	
	From	To
Rutgers University Piscataway, NJ	6/91	3/92

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To
—			

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (o. 3 rad) in any one year?		X	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

100%

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.		X			
2.			X		
3.		X			
4.			X		
5.		X			
6.			X		
7.			X		
8.		X			
9.				X	
10.		X			
11.				X	
12.				X	
13.	X				
14.				X	
15.				X	
16.		X			
17.			X		

18. limit time of exposure, wear protective clothing, maintain distance

19. Thyroid Blocking will accumulate preferentially in the thyroid, a thyroid test should be done after working with significant amounts of Iodine, charcoal ventilation

20. 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 4/22/93

(b) Type of Interview: Radioisotope ✓ Laser ____ X-Ray ____ Reactor ____ Accelerator ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual ____

Regulatory Guides 8.13 and 8.29 ✓ Other ____

(d) Supervisor for radiation protection training: S. TONEGAWA

(e) Authorization Reference: CCR-M

spare # 84381150
C486

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist ____ Finger ____ Badge # ____

Dates monitoring badge issued ____, terminated ____

(g) (Yes, No) Bioassays: Urinalysis ____ Radionuclides ____

In Vivo Measurements: Whole Body ____

Thyroid ____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Joseph R Delaney ____ 4/22/93

Signature Date

TRAINED S. CEL 40 3/2/94

8820

ANSWER SHEET

1. C
2. C
3. ba
4. d
5. b
6. A 2
   B 1
   C 3
   D 4
7. e
8. d
9. b
10. c
11. a
12. b
13. c
14. a
15. a
16. b
17. c
18. d
19. a
20. c
21. a
22. d
23. d
24. c
25. d

Name: Joseph R Delaney Date: 3/2/04

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 10/20/92

1. Name EBRALIDZE ALEXANDER K (Last (Print) / First / M.I.) Birth Date 11/30/56
2. Social Security Number 645-24-1641 Faculty Title
3. Department Biology Staff Title Research Fellow
4. Office No. Ext. Job Title
5. Lab. No E17-336 Ext. 3-7406 Student Year:
6. Project Supervisor Prof. Tonegawa
7. Brief description of present work with radiation:

In vitro DNA/RNA labeling

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amoun to be used per experiement
α-^{32}P	0.5	solution	0.005
α-^{35}S	0.5	solution	0.005

9. Radiation producing equipment to be used in your present work: —

Type: Maximum energy

FOR OFFICE USE ONLY:
LABORATORY ASSIGNMENT
AUTHORIZATION # CCR-14
SUPERVISOR S. TONEGAWA
RPO STAFF D. THAYER
FILM BADGE # 06200
SERIES CODE 841
TERMINATION DATE

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P	^{35}S						
Largest quantity handled	1 mCi								

Name and Addresses of Employers	Dates	
	From	To
Southwestern Medical School at Dallas, Dallas, TX	8/12/91	4/12/92

2. Previous experience with radiation producing equipment: —

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?

Yes	No	Unknown
	✓	

4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?

	✓	

95%

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.		(b)			
2.			(c)		
3.		(b)			
4.			(c)		
5.		(b)			
6.			(c)		
7.			(c)		
8.		(b)			
9.				(d)	
10.		(b)			
11.				(d)	
12.				(d)	
13.				(d)	
14.				(d)	
15.				(d)	
16.		(b)	(c)	(d)	
17.			(c)		

18. short time, shield, distance

19. Thyroid burden

20. 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by DON HOLES Date 10/20/92

(b) Type of Interview: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: C. BROWN

(e) Authorization Reference: CCIR-M

(Note: Interviewer will circle Yes or No for each item below) SPAC #3126057C-02734

(f) (Yes, No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated _____

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

A. Ebralidze
Signature

10/20/92
Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name Ebralidze (Last) Alexander (First) K (M.I.) Date of Birth 11/30/56

Social Security # 645-24-1641

II. Summary of previous (non M.I.T.) occupational Exposure:* N/A

Period From	Period To	Employer and location	Whole body Exposure (rem)
	TOTAL		

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MEDICAL DEPARTMENT

RADIATION PROTECTION OFFICE OF THE ENVIRONMENTAL MEDICAL SERVICE

Date 6/7/88

REGISTRATION AND RADIATION RECORD

SECTION I

1. Name Gerber David J.
   Last (Print) First M.I.
2. Social Security Number 288-60-1285
3. Department Biology
4. Office No. E17-350 Ext. X 6439
5. Lab. No. E17-350 Ext. X 6439
6. Supervisor Dr. Tonegawa Dept Biology
7. Date when present association with M.I.T. began: 9/87 Birth Date 5/25/65
8. Will your work with radiation at M.I.T. continue longer than 3 months ___ 12 months ✓ ?
9. Description of present work with radiation:

^{32}P DNA sequencing
Southern blots
Northern blots

1a. Present association with M.I.T.:
Faculty Title ___
Staff Title ___
Technician Grade ___
Student Graduate Year 1
Guest of Institute ___ Country ___
Other ___

11. Principal radioactive material to be used in your present work:

Radionuclide		Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiment
Sealed	Unsealed			
	^{3}H ^{35}S ^{32}P	20 mCi way 60 mCi " 40 mCi "	nucleotides nucleotides nucleoside phosphates	

12. Radiation producing equipment to be used in your present work:

Type: _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P	^{35}S						
Largest quantity handled (in millicuries)	Sealed	1							
	Unsealed	.01							

Names and Addresses of Employers	Dates	
	From	To
Dr. Philip Perlman 484 W 12th St. Columbus, Ohio 43210	12/85	9/86

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		✓	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		✓	

5. Signature David Gubey Date 6/9/88

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by Margaret C Stevens Date: 9 June 88

(b) Type of Interview: Radioisotope ✓ Accelerator ____ X-Ray ____ Reactor ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓

Reactor RPO Manual ____ Other (describe) Reg Guide 8.13, 8.29

(d) Supervisor for radiation protection training: S. Tornegaara

(e) Authorization Reference: CCR-M-3

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) * Badge: Body ____ Wrist ____ Finger ____ Badge # 04577 B41

(g) (Yes, No) Dosimeter: Dosimeter number ____

(h) (Yes, No) Bioassays: Nuclides to be measured ____

Type of Analysis: Urinalysis ____ Whole Body Measurement ____

Other ____

(i) (Yes, No) Eye Examination: Scheduled by ____

(j) (Yes, No) Physical Examination: Scheduled by ____

(k) (Yes, No) Baseline Blood counts: Scheduled by ____

2. Comments and additional information:

* Dates monitoring badge (s) issued 6/88 ; Terminated ____.

Baseline Thyroid

4967494 10020-99072

3. Request for previous exposure records sent as follows:

Request sent to (place)	Date Sent	Date Received

4. Copy of Summary Record of Exposure (next page) sent to M.I.T. Medical Dept. ____
Date

95%

NAME David Gerber

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.		✓			
2.					
3.		✓	✓		
4.			✓		
5.		✓			
6.			✓		
7.			✓		
8.		✓			
9.					
10.				✓	
11.		✓			
12.				✓	
13.	✓			✓	
14.					
15.				✓	
X.			✓		
17.				✓	
18.			✓		

19. time, distance, shielding Thyroid, Gamma Survey, lead shielding, do a dry run before use

20. 100

3

(k) (Yes, No) Baseline Blood counts: Scheduled by _____

2. Comments and additional information:

* Dates monitoring badge (s) issued 6/84 ; Terminated _____.

Baseline Thyroid

4967494 10020-99072

3. Request for previous exposure records sent as follows:

Request sent to (place)	Date Sent	Date Received

4. Copy of Summary Record of Exposure (next page) sent to M.I.T. Medical Dept. _____ Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and his employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From _____ To: _____ From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges ____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Nuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FOR OFFICE USE ONLY

LAST NAME GRAZIADEI, LINDA S

AUTHORIZATION # CCR-M

SUPERVISOR T. Origanti

RO STAFF D. Hess

FILM BADGE # 02768

SERIES CODE 841

TERMINATION DATE

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 8/4/94

1. Name Graziadei, Linda S.
(Print) Last First M.I.

2. Social Security Number 091-52-9361 Birth Date 5/18/63

3. Department CCR Supervisor S. Tonegawa

4. Faculty ____ Staff ____ Student ____ Other Postdoc

Title Hey yall.

5. Office No. E17-353C Ext. 6522 Lab No. ____ Ext. ____

6. Project Supervisor S. Tonegawa

7. Brief description of present work with radiation:
kinase oligo's
in vitro labeling of tissues

8. Principal radioactive material to be used in your present work: γ^{32}P - ATP
^{32}P - orthophosph.

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
32P	1	γ^{32}P - ATP ^{32}Porthoph.	5 μCi

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	35S	32P				
GREATEST ACTIVITY USED	100-200 μCi	30mCi/exp.				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Cold Spring Harbor Lab 1B ungtown Rd. Cold Spring Harbor, NY 11724					5/88	5/94

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Linda Ghazadei
Signature

8/4/94
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. HAES Date 8/4/91

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: CCR-M Supervisor: S. DUNBAR

Date Terminated: _____ Date Reactivated: _____

Film Badge: Yes ✓ No _____: Body ✓ Wrist _____ Finger _____

Spare Badge # 02729 Reference # 14256516 Issue Date 8/4/91 Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No ✓:

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

95%

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. c
2. b
3. c
4. d
5. a c
6. c
7. d
8. c
9. b
10. c
11. b
12. c
13. d
14. b
15. d
16. c
17. b
18. d
19. c
20. a

FILM BADGE # 96527
SERIES CODE 891
TERMINATION DATE
AUTHORIZATION # CCR-M
SUPERVISOR Tonegawa
RPO STAFF D. Hess

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date OCTOBER 28, 1993

1. Name HASAN MAZAHIR T
(Print) Last First M.I.

2. Social Security Number 028-62-7895 Birth Date 10-10-66

3. Department CENTER FOR CANCER RESEARCH Supervisor DR. SUSUMU TONEGAWA

4. Faculty _____ Staff X Student _____ Other POSTDOC
Title POSTDOCTORAL AFFILIATE

5. Office No. _____ Ext. _____ Lab No. E17-346 Ext. 3-7406

6. Project Supervisor DR. SUSUMU TONEGAWA

7. Brief description of present work with radiation:
LABELLING OF DNA with radio isotopes

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P	0.2mCi/week	Tris buffered solution	5μCi/Reaction
^{35}S		Tris buffered solution	5μCi/Reaction

9. Radiation producing equipment to be used in your present work:

Type _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{32}P	^{125}I				
GREATEST ACTIVITY USED	10 μCi	100 μCi				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
DARTMOUTH COLLEGE, HANOVER, NH 03755					9/88	5/93

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

10-28-93
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. HAES Date 10/28/93

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.:	CCR-[illegible]	Supervisor:	STUNEBAUM
Date Terminated:		Date Reactivated:	

Film Badge: Yes ✓ No _____ : Body ✓ Wrist _____ Finger _____

Spare Badge #	02733	Reference #	111564910	Issue Date	10/28/93	Termination Date	_____
Spare Badge #	_____	Reference #	_____	Issue Date	_____	Termination Date	_____
Spare Badge #	_____	Reference #	_____	Issue Date	_____	Termination Date	_____

Bioassay: Yes _____ No ✓ :

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

10/10

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. b radiation exposure
2. c 1 millirem
3. b radiation absorbed dose
4. a 1250 mrem
5. b as low as reasonably achievable
6. c scrub hands with water and soap
7. c wipe tests followed by scintillation counting
8. b 500 mrem
9. d a fetus
10. b NaI probe, GM probe
11. d lead
12. d about 0.1 mrem/hr
13. a True
14. a 100 mCi
15. d [redacted]
16. b
17. c
18. shielding, exposure time, distance.
19. Thyroid. work in air circulating hood.
20. 3-2180 or 3-3360

$\frac{(1)(1)^2}{9} = r = \frac{1}{9}$

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 9/25/92

1. Name HINDS (Last (Print)) HEATHER (First) L. (M.I.) Birth Date 6/11/69
2. Social Security Number 351-66-9562 Faculty Title
3. Department BIOLOGY Staff Title
4. Office No. Ext. Job Title RESEARCH FELLOW
5. Lab. No. E17 Ext. 3-3010 Student Year:
6. Project Supervisor DAVID HOUSMAN
7. Brief description of present work with radiation:

^{35}S and ^{32}P labeling of DNA probes for use in Southern/Northern/in situ hybridizations.

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiement
^{35}S	1mCi	dATP	~100.4Ci
^{32}P	1mCi		~100.4Ci

9. Radiation producing equipment to be used in your present work:

Type: ∅ Maximum energy

AUTHORIZATION # ccl-F/ccm FILM BADGE # 06127
SUPERVISOR Housman/Longacre SERIES CODE 6226-41
RPO STAFF D. Hines TERMINATION DATE

FOR OFFICE USE ONLY:
HINDS, Heather L. 351-66-9562

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{35}S	^{32}P						
Largest quantity handled		200 uCi	.5 mCi						

Name and Addresses of Employers	Dates	
	From	To
STANFORD UNIVERSITY	9/86	6/90
OXFORD UNIVERSITY	9/90	9/91

2. Previous experience with radiation producing equipment: 9/88 AND 12/88

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		X	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.	
1.			X			
2.		X				
3.			X			
4.		X				
5.			X			
6.			X			
7.		X				
8.				X		
9.				X		
10.	X					
11.				X		
12.			X			
13.				X		
CAB → 14.	3	1	2			1 = HIGHEST
15.			X			
16.		X				
17.		X				* 4 very risky / can't be well controlled - call RPO

18. TIME, DISTANCE, SHIELDING

19. THYROID - WHEN WORKING WITH ^{125}I, WORK IN A HOOD WITH CHARCOAL FILTERING (TO AID IN ^{125}I ABSORPTION)

20. 3-2180

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by M Fitzgerald Date 9/25/92

(b) Type of Interview: Radioisotope ✓ Laser ✓ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: Houseman

(e) Authorization Reference: CCR-F

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes) No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # SPARE #04011

Dates monitoring badge issued _____, terminated _____

(g) (Yes) (No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

Transfer to Tonegawa Lab 4/13/93

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Heather L Hinds 9/25/92

Signature Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ _____ _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FOR OFFICE USE ONLY:

LAST NAM [redacted]

AUTHORIZATION # CCR 221

SUPERVISOR S. TANEZAWA

RPO STAFF D. HAES

FILM BADGE # 06590

SERIES CODE 641

TERMINATION DATE

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 1/13/94

1. Name Hsu (Print) Last Albert First L M.I.

2. Social Security Number 213-82-2307 Birth Date 10/26/74

3. Department Biology Supervisor Susumu Tonegawa

4. Faculty ____ Staff ____ Student X Other ____

Title UROP Student / Research Assistant

5. Office No. ~~E17-~~ Ext. ~~3-6567~~ Lab No. 3-6551 Ext. ____

6. Project Supervisor Susumu Tonegawa / Tilon Lafaille

7. Brief description of present work with radiation:
I will be working with [^{3}H]-thymidine, and doing cell cycle analysis

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material: NONE

RADIONUCLIDE(S)						
GREATEST ACTIVITY USED						
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO

2. Previous experience with radiation producing equipment: NONE

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Albert L Hsu
Signature

1/13/94
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hales Date 1/13/94

Type of Interview: Radioisotope ✓ X-Ray ____ Reactor ____ Accelerator ____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual ____ Other ____

Authorization No.: CCR-M Supervisor: S. Wingard

Date Terminated: ____ Date Reactivated: ____

Film Badge: Yes ✓ No ____ : Body ✓ Wrist ____ Finger ____

Spare Badge # 04011 Reference # 695222D Issue Date 1/25/94 Termination Date ____

Spare Badge # ____ Reference # ____ Issue Date ____ Termination Date ____

Spare Badge # ____ Reference # ____ Issue Date ____ Termination Date ____

Bioassay: Yes ____ No ✓ :

Urinalysis ____ Radionuclides ____

In vivo Measurements: Whole Body ____ Thyroid ____

10/20/20

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1.	c)	C
2.	b)	B
3.	c)	C
4.	b)	B
5.	c)	C
6.	c)	C
7.	b)	B
8.	d)	D
9.	d)	D
10.	a)	A
11.	d)	D
12.	c)	C
13.	d)	D
14.	c, a, b	C, A, B
*15.	c)	C
*16.	b)	B
17.	b)	B

18. ~~time, distance, shielding~~ (increase/maximize all 3 as much as possible)

19. ~~thyroid~~, charcoal filtered hood

20. 100

Badge # 05804

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MEDICAL DEPARTMENT

RADIATION PROTECTION OFFICE OF THE ENVIRONMENTAL MEDICAL SERVICE

Date July 7 '77

REGISTRATION AND RADIATION RECORD

SECTION I

1. Name ~~Mrs.~~ Miss ~~Mr.~~ Huang Shu Ying
   Last (Print) First M.I.

1a. Present association with M.I.T.:

2. Social Security Number 016544664

Faculty Title

3. Department Biology

Staff Title

4. Office No. E17-330 56-707 Ext. x 6502 3-7006

Technician Grade ✓

5. Lab. No. Ext.

Student Year

6. Supervisor Dr Ritter (TONEGAWA "91") Dept. Biology ("CCR")

Guest of Institute Country

Other

7. Date when present association with M.I.T. began: June 13 '77 Birth Date July 5 51

8. Will your work with radiation at M.I.T. continue longer than 3 months ___ 12 months ✓ ?

9. Description of present work with radiation:

^{3}H, ^{14}C, ^{35}S, ^{32}P ^{125}I

11. Principal radioactive material to be used in your present work:

Radionuclide		Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiment
Sealed	Unsealed			
	✓			

12. Radiation producing equipment to be used in your present work: [illegible]

Type: full Maximum energy full E17-629 trained by M.S. trained JJ 11/27/89.

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{3}H	^{14}C	^{32}P					
Largest quantity handled (in millicuries)	Sealed								
	Unsealed								

Names and Addresses of Employers	Dates	
	From	To
Dr. Peter Parsons Mount Holyoke College South Hadley MA 01075	July, 76	May 77

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To
~~Scintillation counter~~			

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?			✓
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?			✓

5. Signature Shu Ying Huang Date July 7 '77

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by P Black Date: 7/7/77

(b) Type of Interview: Radioisotope ✓ Accelerator ____ X-Ray ____ Reactor ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ____

Reactor RPO Manual ____ Other (describe) Reg. Guide 8.13

(d) Supervisor for radiation protection training: Gofter / Tonegawa

(e) Authorization Reference: 7 ~~20~~ 40 / CCR-m

(Note: Interviewer will circle Yes or No for each item below)

7/7/77

(f) (Yes, No) Film Badge: Body ✓ Wrist ✓ Ring ____ Group # B15-1126

(g) (Yes, (No)) Dosimeter: Dosimeter number ____

* (h) (Yes, (No)) Bioassays: Nuclides suspected ____

Type of Analysis: Urinalysis ____ Whole Body Measurement ____

Other ____

(i) (Yes, (No)) Eye Examination: Scheduled by ____

(j) (Yes, (No)) Physical Examination: Scheduled by ____

(k) (Yes, (No)) Baseline Blood counts: Scheduled by ____

2. Comments:

* Thyroid - Baseline 9/7/77 Badges terminated 7/27/83.
" reactivated 9/9/83

841. ~~terminated~~ reactivated 9/91 in Tonegawa lab

3. Request for previous exposure records sent as follows:

Request sent to (place)	Date Sent	Date Received

4. Copy of Summary Record of Exposure (next page) sent to M.I.T. Medical Dept. ____ Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and his employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From _____ To: _____ From: _____ To: _____

B. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges ____ TLD _____)

Monitoring period	1977	1978	1979	1980	1981	1982					Totals
Penetrating whole body	.000	.000	.040	.040		.010					
Skin of whole body	.000	.000	.040	.250		.010					
Wrist	.000	.000	.250	.050		.020					
Finger						.030					

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Nuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FILM BADGE # 06401

SERIES CODE 3-11

TERMINATION DATE

AUTHORIZATION # CCR-IN

SUPERVISOR TOM NEGAMI

RPO STAFF HAES

HUANG, ZUOSHI J.

RP-50
Revised 1/94

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 1/9/95

1. Name Huang (Print) Last Zuoshi First Josh M.I.

2. SSN 600-24-1134 Birth Date 8/2/1963 Sex F☐ M☒

3. Department Biology Supervisor Susumu Tonegawa

4. Faculty ____ Staff X Student ____ Other ____

Title postdoc fellow

5. Office No. E17-353 Ext. 3-6551 Lab No. E17-353 Ext. 3-6551

6. Project Supervisor Susumu Tonegawa

7. Brief description of present work with radiation:
use P^{32} to screen cDNA libraries
use S^{35} to do DNA sequencing

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
P^{32}	~~0.01~~ 1mCi		0.001 mCi
S^{35}	~~0.0005~~ 0.5mCi		0.0005 mCi

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Have you had previous experience with radioactive material?

☒ Yes {Fill out form RP-59, and the information requested below} ☐ No

RADIONUCLIDE(S)	P^{32}	S^{35}				
GREATEST ACTIVITY USED	0.05mCi	0.001mCi				
EMPLOYER(S) NAME & ADDRESS (Note: This information is required for workers monitored for occupational radiation dose during the current year.)					DATES FROM	TO
* List most recent first *						
Brandeis University Dept. of Biology					7/90	10/94

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

1/9/95

Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: W. Irwin Date 1/11/95

Type of Interview: ☒ Radioisotope ☐ X-Ray ☐ Reactor ☐ Accelerator

Instruction Material(s) Supplied: ☒ RPO Required Procedures ☐ Reactor RPO Manual

☒ Information Sheets ☒ Regulatory Guides 8.13 and 8.29 ☒ MIT RPC Policy Regarding Pregnant Workers

☐ Other _____

Authorization No.: CCR-M Supervisor: Tonegawa

Date Terminated: _____ Date Reactivated: _____

External Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☒ Requested by user

Internal Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☐ Requested by user

☒ Body ☐ Wrist ☐ Finger

☐ Urinalysis: Radionuclides _____
☐ Whole Body ☐ Thyroid

Reference # 01759 Spare Badge # 92491922 Issue Date 1/11/95 Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

☐ Summary of annual dose report required per 10 CFR 19.13(b)

☐ Prior dose history request sent by: _____ _____
(name) (date)

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers by marking the box next to the selected answer.

DO NOT MARK THE QUIZ !!

Record the Exam Number: II

101 / .

1.	☐ a	☐ b	☒ c	☐ d
2.	☐ a	☐ b	☐ c	☒ d
3.	☐ a	☐ b	☒ c	☐ d
4.	☐ a	☒ b	☐ c	☐ d
5.	☐ a	☐ b	☒ c	☐ d
6.	☐ a	☐ b	☒ c	☐ d
7.	☐ a	☒ b	☐ c	☐ d
8.	☐ a	☐ b	☒ c	☐ d
9.	☐ a	☐ b	☐ c	☒ d
10.	☐ a	☐ b	☒ c	☐ d
11.	☐ a	☐ b	☒ c	☐ d
12.	☐ a	☒ b	☐ c	☐ d
13.	☐ a	☐ b	☐ c	☒ d
14.	☐ a	☐ b	☒ c	☐ d
15.	☒ a	☐ b	☐ c	☐ d
16.	☐ a	☒ b	☐ c	☐ d
17.	☐ a	☐ b	☒ c	☐ d
18.	☐ a	☐ b	☐ c	☒ d
19.	☐ a	☒ b	☐ c	☐ d
20.	☐ a	☐ b	☐ c	☒ d

RP-50
Revised: 12/88

FILM BADGE # 06318
SERIES CODE 54
TERMINATION DATE

AUTHORIZATION # CCR-m
SUPERVISOR S. Tonegawa
RPO STAFF D Hayes

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date April 16, 1993

1. Name IWASATO (Last (Print)) TAKUJI (First) (M.I.) Birth Date Oct. 15, 1963
2. Social Security Number _____ Faculty Title _____
3. Department Center for Cancer Research Staff Title _____
4. Office No. _____ Ext. _____ Job Title Postdoctoral Fellow
5. Lab. No. E17-358 Ext. 6551 Student _____ Year: 2 yrs.
6. Project Supervisor Susumu Tonegawa
7. Brief description of present work with radiation:

Labelling of DNA and RNA.

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amoun to be used per experiement
^{32}P, ^{35}S	1 m Ci	α CTP α ATP	1 m Ci

9. Radiation producing equipment to be used in your present work:

Type: no Maximum energy ~~MeV~~ 0

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P							
Largest quantity handled		1400 μC:							
Name and Addresses of Employers							Dates		
							From	To	
Department of Biophysics, Kyoto Univ.							Apr. 1, 1950	Mar 30, 1953	

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To
—	—	—	—

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		X	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

100 %

	a.	b.	c.	d.	e.
1.		X			
2.			X		
3.		X			
4.			X		
5.		X			
6.			X		
7.			X		
8.		X			
9.				X	
10.		X			
11.				X	
12.				X	
13.	X				
14.				X	
15.				X	
16.		X			
17.			X		

18. Distance, Shielding, Time

19. Thyroid, Thyroid measurement

20. 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 4/16/93

(b) Type of Interview: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: S. TONEGAWA

(e) Authorization Reference: CCR-44

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # 8438102C #04003

Dates monitoring badge issued _____, terminated _____

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Takuji Iwasato — Signature

April 16, 1993 — Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MEDICAL DEPARTMENT

RADIATION PROTECTION OFFICE OF THE ENVIRONMENTAL MEDICAL SERVICE

Date _____

REGISTRATION AND RADIATION RECORD

SECTION I

1. Name LAFAILLE (Last (Print)) Juan (First) J. (M.I.)

1a. Present association with M.I.T.:

2. Social Security Number _____ Faculty Title _____

3. Department Center for Cancer Research Staff Title Post doctoral fellow

4. Office No. _____ Ext. _____ Technician Grade _____

5. Lab. No. E-17 353 Ext. 3-6551 Student _____ Year _____

6. Supervisor Dr. S. Tonegawa Dept. C. Cancer Res. Guest of Institute ___ Country _____

Other _____

7. Date when present association with M.I.T. began: 6/9/88 Birth Date 8/29/55

8. Will your work with radiation at M.I.T. continue longer than 3 months ___ 12 months X ?

9. Description of present work with radiation:

- "in vitro" labelling of nucleic acids and proteins.
- Incorporation of radioactive precursors (^{35}S-Met) of proteins into living cells "in vitro".

11. Principal radioactive material to be used in your present work:

Radionuclide		Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiment
Sealed	Unsealed			
	^{32}P	0.5 mCi	Phosphate (liq.)	100 μCi
	^{125}I	0.5 mCi	Iodide (liq.)	200 μCi
	^{35}S	1 mCi	Methionine (liq.)	200 μCi

12. Radiation producing equipment to be used in your present work:

Type: _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{3}H	^{14}C	^{35}S	^{32}P	^{125}I	^{131}I		
Largest quantity handled (in millicuries)	Sealed								
	Unsealed	0.1	0.02	0.5	0.1	0.2	0.2		

Names and Addresses of Employers	Dates	
	From	To
University of São Paulo (BRAZIL)	2/1983	5/1988

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		X	

5. Signature yyZaf Date 6/17/88

SECTION III . (to be completed by Radiation Protection Office)

1. (a) Interviewed by Margaret C Stern Date: 21 Jun 88

(b) Type of Interview: Radioisotope ✓ Accelerator ____ X-Ray ____ Reactor ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓

Reactor RPO Manual ____ Other (describe) Reg Guide 8.13, 8.29

(d) Supervisor for radiation protection training: S. Tonnessen

(e) Authorization Reference: CCR-M-3

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) * Badge: Body ✓ Wrist ____ Finger ____ Badge # B41 04614 TLD

(g) (Yes, No) Dosimeter: Dosimeter number ____

(h) (Yes, No) Bioassays: Nuclides to be measured ____

Type of Analysis: Urinalysis ____ Whole Body Measurement ____

Other ____

(i) (Yes, No) Eye Examination: Scheduled by ____

(j) (Yes, No) Physical Examination: Scheduled by ____

(k) (Yes, No) Baseline Blood counts: Scheduled by ____

2. Comments and additional information:

* Dates monitoring badge (s) issued 7/88 : Terminated ____.

5167027 10020-01763

3. Request for previous exposure records sent as follows:

Request sent to (place)	Date Sent	Date Received

4. Copy of Summary Record of Exposure (next page) sent to M.I.T. Medical Dept. ____ Date

NAME Juan J. Lafaille

100%

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.		X			
2.			X		
3.		X			
4.			X		
5.		X			
6.			X		
7.			X		
8.		X			
9.					
10.		X		X	
11.					
12.				X	
13.	X			X	
14.					
15.				X	
16.			X		
17.		X			
18.	TIME DISTANCE SHIELDING				
19.	THYROID - IODINE IS VOLATILE. WORK ~~SHOULD~~ BE DONE IN A SPECIAL (CHARCOAL) HOOD ~~FUME~~				
20.	TOO				

(A) (Yes, No) baseline blood counts: scheduled 9) _____

2. Comments and additional information:

* Dates monitoring badge (s) issued 7/88 ; Terminated _____.

5167027 10020-01763

3. Request for previous exposure records sent as follows:

Request sent to (place)	Date Sent	Date Received

4. Copy of Summary Record of Exposure (next page) sent to M.I.T. Medical Dept. _____ Date

100%

ANSWER SHEET

1. c
2. c
3. a
4. d
5. b
6. A 2
   B 1
   C 3
   D 4
7. d
8. d
9. b
10. c
11. a
12. b
13. c
14. a
15. a
16. b
17. c
18. d
19. a
20. c
21. d
22. d
23. d
24. c
25. d

Name: Jean Lafaille Date: 6/21/90

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and his employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From _____ To: _____ From: _____ To: _____
B. Monitoring badge not required [ ]
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges ____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Nuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FILM BADGE # 26915
SERIES CODE 891
TERMINATION DATE

AUTHORIZATION # CCR 117
SUPERVISOR Dr. Tonegawa
RPO STAFF D. Hess

LEVELT, CHRISTIAAN N.

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 1-10-95

1. Name LEVELT (Print) Last CHRISTIAAN First N M.I.

2. Social Security Number 020-78-3174 Birth Date 2-23-68

3. Department CCR Supervisor Dr. S. Tonegawa

4. Faculty _____ Staff _____ Student _____ Other Post Doc

Title PhD

5. Office No. E17.360 Ext. x3. Lab No. E17-358 Ext. x3655

6. Project Supervisor Dr. S. TONEGAWA

7. Brief description of present work with radiation:

^{32}P for Southern / Northern Blotting
^{35}S protein labelling

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P ^{35}S	mCi "	^{32}PdNTP's (liquid)	

9. Radiation producing equipment to be used in your present work:

Type _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material: NONE

RADIONUCLIDE(S)						
GREATEST ACTIVITY USED						
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

[signature] Signature

1-10-95 Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. HAES Date 1/10/95

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: CCR-M Supervisor: S. RINGANA

Date Terminated: _____ Date Reactivated: _____

TRAINED GAMMA CCR 40 DOT

Film Badge: Yes ✓ No _____: Body ✓ Wrist _____ Finger _____

Spare Badge # 02730 Reference # 9299203E Issue Date 1/11/95 Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No _____:

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

80%

ANSWER SHEET

1. C
2. C
3. CA
4. BD
5. B
6. a. 2
   b. 1
   c. 3
   d. 4
7. D
8. D
9. B
10. DC
11. A
12. B
13. C
14. A
15. A
16. B
17. C
18. D
19. DA
20. C
21. D
22. D
23. C
24. DC
25. D

Name: Christian [illegible] Date: 9/27/9[illegible]

Lab: Tenerife Phone: [illegible]

Exam I

95%

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. C
2. B
3. C
4. D
5. C
6. C
7. D
8. C
9. B
10. C
11. B
12. C
13. D
14. B
15. D
16. C
17. ~~D~~ B
18. D
19. C
20. A

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 6/8/93

1. Name LIM (Last (Print)) DINA (First) J (M.I.) Birth Date 5/14/71
2. Social Security Number 084-72-1343 Faculty Title
3. Department BIOLOGY Staff Title
4. Office No. 16-610 Ext. Job Title
5. Lab. No. Ext. Student Year: 94
6. Project Supervisor PROFESSOR LISA STEINER
7. Brief description of present work with radiation:
   Probing w/

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amount to be used per experiement
?			

9. Radiation producing equipment to be used in your present work:

Type: Maximum energy

AUTHORIZATION # 7-7 (CCL-B) FILM BADGE # 06408
SUPERVISOR STEINER (Nguyen) SERIES CODE 5/27/94
RPO STAFF M. FITZgerald TERMINATION DATE
FOR [redacted]
LAST

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material: NO

Radionuclides handled									
Largest quantity handled									

Name and Addresses of Employers	Dates	
	From	To

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?			
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?			

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

100%

	a.	b.	c.	d.	e.
1.			✓		
2.		✓			
3.			✓		
4.		✓			
5.			✓		
6.			✓		
7.		✓			
8.				✓	
9.	✓			✓	
10.	✓				
11.				✓	
12.			✓		
13.	~~a, c~~			✓	
14.	c, a, b				
15.			✓		
16.		✓			
17.		✓			

18. proper clothing (gloves, lab coat); shielding; distance from exposing rad by tongs; time is as short as poss
19. Ingrid
work in charcoal filtered hood
check in if signing 7 100uCi to have baseline thyroid measurement before beginning
within 1 week after experiment, have another thyroid burden measurement
20. 3 - 2180 or 3 - 2760
after work hours - 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by mfitzgerald Date 6/8/93

(b) Type of Interview: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: Steiner / Tarrytown

(e) Authorization Reference: 7-Y / CCR-M

Spare #C706873O-C2731

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes) No *Badge: Body ✓ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated _____

(g) (Yes) No Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

Reactivated 7.1.94 at transference to Tarrytown Lab to CCR-M Spare # 3469417C-C1767

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Signature

9 6/8/93
Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name LIM (Last) DIVA (First) J (M.I.) Date of Birth 05/14/93

Social Security # 084-72-1343

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period From	Period To	Employer and location	Whole body Exposure (rem)
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised: 12/88

AUTHORIZATION # CC2-M
SUPERVISOR S. Tonegawa
RPO STAFF D. Hess
LAST NAME Li
FILM BADGE # 05279
SERIES CODE 841
TERMINATION DATE 10/31/91

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date Sept 9, 1991

1. Name Yuqing (Last (Print)) Li (First) (M.I.) Birth Date Oct. 12, 1963
2. Social Security Number 028-74-9369 applying now Faculty Title
3. Department Center for Cancer Research Staff Title
4. Office No. E17-115 Ext. 8-7448 Job Title Research Associate
5. Lab. No. E17-347 Ext. 3-8762 Student Year:
6. Project Supervisor Susumu Tonegawa
7. Brief description of present work with radiation:

DNA-RNA and Protein manipulation involving ^{32}P, ^{35}S and ^{3}H. Cell cytotoxic assays using ^{51}Cr.

8. Principal radioactive material to be used in your present work:

Radionuclides (^{32}P, ^{35}S, ^{3}H, ^{51}Cr)	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amou to be used per experiement
^{32}P, ^{35}S, ^{3}H, ^{51}Cr	1 ~ 5 mC;	^{32}P - nucleotide ^{35}S - nucleotide, amino acids ^{3}H amino acids ^{51}Cr Na_2CrO_4	1 mC

9. Radiation producing equipment to be used in your present work:

Type: None Maximum energy

LI, Yuqing

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{3}H	^{32}P	^{35}S	^{51}Cr				
Largest quantity handled		5 mC;	1 mC;	1 mC,	2 mC;				
Name and Addresses of Employers							Dates From		To
Nagoya University. Japan, 464.							Jan 1988		Aug 1991

2. Previous experience with radiation producing equipment: None

Types of Equipment	Names and Addresses of Employers	Dates From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		✓	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		✓	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

III

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.			(c)		
~~2.~~	(a)	(b)			
3.			(c)		
4.		(b)			
5.			(c)		
6.			(c)		
7.		(b)			
8.				(d)	
9.					
~~10.~~	(a)	(b)			
11.				✓	
12.			(c)		
13.				(d)	
14.					c→a→b
15.			(c)		
16.		(b)			
17.		(b)			
~~18.~~	ALARA. wear lab coat & use shield if possible. wash hands after handling wear				
19.	thyroid. gonard.				
20.	100				

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 9/10/91

(b) Type of Interview: Radioisotope ✓ Laser ____ X-Ray ____ Reactor ____ Accelerator ____

(c) Instruction Material Supplied: Required Procedures ____ Information Sheets ✓ Reactor RPO Manual ____

Regulatory Guides 8.13 and 8.29 ✓ Other ____

(d) Supervisor for radiation protection training: S. TANEGAWA

(e) Authorization Reference: CCR-M

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist ____ Finger ____ Badge # ____

Dates monitoring badge issued ____, terminated 12/31/94

(g) (Yes, No) Bioassays: Urinalysis ____ Radionuclides ____

In Vivo Measurements: Whole Body ____

Thyroid ____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Signature ____ Date Sept. 10, 1991

TRAINED δ-CELL E17-629

1/31/92

92%

ANSWER SHEET

1. C
2. ~~b~~ b c
3. a
4. a
5. b
6. A 2
   B 1
   C 3
   D 4
7. d
8. d
9. b
10. c
11. a
12. b
13. c
14. a
15. a
16. b
17. C
18. d
19. ~~b~~ b A
20. C
21. d
22. d
23. d
24. ~~3~~ C
25. ~~1~~ D

Name: Yuqing Li

Date: Jan 31, 1992

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FILM BADGE # 06842
SERIES CODE 6 41
TERMINATION DATE
AUTHORIZATION # CCR-121
SUPERVISOR S. Tonegawa
RPO STAFF D. Hess
FOR [redacted] LAST MARUSIC-GALESIC, SUZANA

RP-50
Revised 1/94

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 10/14/94

1. Name Marusic-Galesic Suzana
(Print) Last First M.I.

2. SSN 534-94-3728 Birth Date 10/25/19 61 Sex F☒ M☐

3. Department Cancer Center Supervisor Tonegawa

4. Faculty ____ Staff ____ Student ____ Other ✓

Title Research Affiliate

5. Office No. 253-6522 Ext. ____ Lab No. E17-353 Ext. ____

6. Project Supervisor Tonegawa

7. Brief description of present work with radiation:
^3H-thymidine incorporation assay

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^3H-thy-id	5 mCi	thymidine	20 μCi

9. Radiation producing equipment to be used in your present work:

Type None Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Have you had previous experience with radioactive material?

☒ Yes {Fill out form RP-59, and the information requested below} ☐ No

RADIONUCLIDE(S)	^3H	I-125	Cr-51	P-32		
GREATEST ACTIVITY USED	1 mCi	10 mCi	1 mCi	1 mCi		
EMPLOYER(S) NAME & ADDRESS (Note: This information is required for workers monitored for occupational radiation dose during the current year.) * List most recent first *					DATES FROM	TO
Institute Ruder Boskovic, Zagreb, CROATIA					1988	1994
Max-Planck-Institute für Biology, Tübingen, Germany					1994, Jan	1994, Apr
Natl Institute of Health, Bethesda, MD, U.S.A.					1986	1988

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO
Gamma cell	Natl. Institute of Health Bethesda, MD	1986	1988

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

10/14/94
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hess Date 10/14/94

Type of Interview: ☒ Radioisotope ☐ X-Ray ☐ Reactor ☐ Accelerator

Instruction Material(s) Supplied: ☐ RPO Required Procedures ☐ Reactor RPO Manual

☑ Information Sheets ☑ Regulatory Guides 8.13 and 8.29 ☑ MIT RPC Policy Regarding Pregnant Workers

☐ Other _____

Authorization No.: ECR-M Supervisor: S. Wukawa

Date Terminated: _____ Date Reactivated: _____

External Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☒ Requested by user

☒ Body ☐ Wrist ☐ Finger

Internal Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☐ Requested by user

☐ Urinalysis: Radionuclides _____
☐ Whole Body ☐ Thyroid

Reference # 4716 Spare Badge # 640834UE Issue Date 6/24/94 Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

☐ Summary of annual dose report required per 10 CFR 19.13(b)

☐ Prior dose history request sent by: _____ _____
(name) (date)

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers by marking the box next to the selected answer.

DO NOT MARK THE QUIZ !!

Record the Exam Number: 1

1.	☐ a	☐ b	☒ c	☐ d
2.	☐ a	☒ b	☐ c	☐ d
3.	☐ a	☐ b	☒ c	☐ d
4.	☐ a	☐ b	☐ c	☒ d
5.	☐ a	☐ b	☒ c	☐ d
6.	☐ a	☐ b	☒ c	☐ d
7.	☐ a	☐ b	☐ c	☒ d
8.	☐ a	☐ b	☒ c	☐ d
9.	☐ a	☒ b	☐ c	☐ d
10.	☐ a	☐ b	☒ c	☐ d
11.	☐ a	☒ b	☐ c	☐ d
12.	☐ a	☐ b	☒ c	☐ d
13	☐ a	☒ b	☐ c	☐ d
14.	☐ a	☒ b	☐ c	☐ d
15.	☐ a	☐ b	☐ c	☒ d
16.	☐ a	☐ b	☒ c	☐ d
17.	☐ a	☒ b	☐ c	☐ d
18.	☐ a	☐ b	☐ c	☒ d
19.	☐ a	☐ b	☒ c	☐ d
20.	☒ a	☐ b	☐ c	☐ d

FOR LAST, FIRST, M.I.: NAKAZAWA, KAZUTOSHI

AUTHORIZATION # CCR-MIT

SUPERVISOR S. TONEGAWA

RPO STAFF D. Hayes

FILM BADGE # 07161

SERIES CODE 854

TERMINATION DATE

RP-50
Revised 1/94

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 9/25/95

1. Name Nakazawa Kazutoshi
(Print) Last First M.I.

2. SSN ___-___-____ Birth Date 11/12/19 60 Sex F☐ M☒

3. Department Center for Cancer Res Supervisor Susumu TONEGAWA

4. Faculty ____ Staff v Student ____ Other ____

Title Postdoctral Fellow

5. Office No. ____ Ext. ____ Lab No. E17-353 Ext. 3-6551

6. Project Supervisor SUSUMU TONEGAWA

7. Brief description of present work with radiation:
Radiolabeling of DNA, RNA and peptides with α-^{32}P dCTP, [γ-^{32}P] ATP, and [α-^{35}S] dCTP

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P	1	[α-^{32}P] dCTP	0.05 mCi
^{32}P	0.25	[γ-^{32}P] ATP	0.01 mCi
^{32}P	0.25	[α-^{32}P] ATP	0.05 mCi
^{35}S	0.25	dCTPαS [^{35}S]	0.05 mCi

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Have you had previous experience with radioactive material?

☒ Yes {Fill out form RP-59, and the information requested below} ☐ No

RADIONUCLIDE(S)	^{32}P	^{35}S				
GREATEST ACTIVITY USED	0.1mCi	0.5mCi				
EMPLOYER(S) NAME & ADDRESS (Note: This information is required for workers monitored for occupational radiation dose during the current year.)					DATES FROM	TO
* List most recent first *						
Masao ITO, Lab for Synaptic Function, RIKEN Institute					Apr '91	Jun '95
Toshio FUKASAWA, Keio University School of Med					Apr '89	Mar '91

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Kazutoshi Nakazawa
Signature

Sept 25, 1995
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hess Date 9/25/95

Type of Interview: ☒ Radioisotope ☐ X-Ray ☐ Reactor ☐ Accelerator

Instruction Material(s) Supplied: ☒ RPO Required Procedures ☐ Reactor RPO Manual

☒ Information Sheets ☒ Regulatory Guides 8.13 and 8.29 ☒ MIT RPC Policy Regarding Pregnant Workers

☐ Other _____

Authorization No.: CCR-m Supervisor: S. TUNEBAUM

Date Terminated: _____ Date Reactivated: _____

External Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☒ Requested by user

Internal Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☐ Requested by user

☒ Body ☐ Wrist ☐ Finger

☐ Urinalysis: Radionuclides _____
☐ Whole Body ☐ Thyroid

Reference # 761925F Spare Badge # 04460 Issue Date 9/27/95 Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

☐ Summary of annual dose report required per 10 CFR 19.13(b)

☒ Prior dose history request sent by: DHC (name) 10/18/95 (date)

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers by marking the box next to the selected answer.

DO NOT MARK THE QUIZ !!

Record the Exam Number: III

1.	☐ a	☐ b	☒ c	☐ d
2.	☐ a	☒ b	☒ c	☐ d
3.	☐ a	☐ b	☐ c	☒ d
4.	☐ a	☐ b	☒ c	☐ d
5.	☒ a	☐ b	☐ c	☐ d
6.	☐ a	☒ b	☐ c	☐ d
7.	☐ a	☐ b	☒ c	☐ d
8.	☐ a	☐ b	☐ c	☒ d
9.	☐ a	☒ b	☐ c	☐ d
10.	☐ a	☐ b	☐ c	☒ d
11.	☐ a	☐ b	☒ c	☐ d
12.	☐ a	☐ b	☐ c	☒ d
13.	☐ a	☐ b	☒ c	☐ d
14.	☐ a	☒ b	☐ c	☐ d
15.	☐ a	☐ b	☒ c	☐ d
16.	☐ a	☐ b	☒ c	☐ d
17.	☐ a	☒ b	☐ c	☐ d
18.	☐ a	☐ b	☒ c	☐ d
19.	☐ a	☐ b	☐ c	☒ d
20.	☐ a	☐ b	☒ c	☐ d

RP-50
Revised: 12/88

FILM BADGE # 06317
SERIES CODE 841
TERMINATION DATE
AUTHORIZATION # CCR-11
SUPERVISOR S. Tonegawa
RPO STAFF D. Hess

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date April 9, 1993

1. Name Poss (Last) Kenneth (First) O (M.I.) Birth Date 4/15/71
2. Social Security Number 395-90-4506 Faculty Title
3. Department Biology Staff Title
4. Office No. Ext. Job Title
5. Lab. No. E17-346 Ext. 3 x 7406 Student ✓ Year: G 1
6. Project Supervisor Dr. S. Tonegawa
7. Brief description of present work with radiation:

^{32}P & ^{35}S labelling of nucleotides for DNA sequencing and analysis

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amoun to be used per experiement
^{32}P-NTP ^{35}S-NTP perhaps ^{35}S-Met	1 mCu	^{32}P-ATP	perhaps 1 mCu

9. Radiation producing equipment to be used in your present work:

Type: Maximum energy

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P-CTP	^{32}P-VTP	^{35}S-met					
Largest quantity handled		1 mCi	1 mCi						

Name and Addresses of Employers	Dates	
	From	To
Dr John Tymoczko Carleton College Northfield, MN 55057	1/91	5/92

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		X	

93%

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

	a.	b.	c.	d.	e.
1.		X			
2.			X		
3.		X			
4.			X		
5.		X			
6.			X		
7.			X		
~~8.~~	X	(b.)			
9.				X	
10.		X			
11.				X	
12.				X	
13.	X				
14.				X	
15.				X	
16.		X			
17.			X		

-2 ~~18.~~ Time, Distance, Exposure SHIELDING

19. Thyroid Gland
limit exposure, use water bags

20. 100

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 4/16/93

(b) Type of Interview: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: S. TONGANA

(e) Authorization Reference: CCR-M

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated _____

8438101C
A 04006

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Signature _____ Date 4/16/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 08/04/91

1. Name PROSSER HAYDN M — Birth Date 08/05/65
   Last (Print) First M.I.
2. Social Security Number _____ Faculty Title _____
3. Department CENTER FOR CANCER RESEARCH Staff Title POSTDOCTORAL FELLO
4. Office No. _____ Ext. _____ Job Title _____
5. Lab. No. 253-6434 Ext. _____ Student _____ Year: _____
6. Project Supervisor DR. S. TONEGAWA
7. Brief description of present work with radiation:

   LABELLING OF DNA PROBES WITH α-^{32}P-dNTP's OR γ-^{32}P-dNTP's
   ENZYMATIC ASSAYS USING ^{14}C-CHLORAMPHENICOL OR ^{14}C-ACETYL CO
   DNA SEQUENCING REACTIONS USING ^{35}S-dATP

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amoun to be used per experiement
^{32}P	1	LIQUID: αdNTP γ-dNTP	250 μCi
^{14}C	1	LIQUID: ACETYL CoA OR CHLORAMPHENICOL	100 μCi
^{35}S	1	LIQUID dATP	250 μCi

9. Radiation producing equipment to be used in your present work:

   Type: _____ Maximum energy _____

AUTHORIZATION # CCR-M FILM BADGE # 05659
SUPERVISOR S. TONEGAWA SERIES CODE 341
RPO STAFF D. HAYES TERMINATION DATE
LAST NAME PROSSER, Haydon M. P120 55672

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P	^{14}C	^{35}S					
Largest quantity handled		1mCi	0.5mCi	1mCi					
Name and Addresses of Employers							Dates		
							From	To	
IMPERIAL CANCER RESEARCH FUND, 44 LINCOLN'S INN FIELDS, LONDON. WC1. ENGLAND.							SEPT. 1987	JULY 1990	

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unkn
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		✓	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		✓	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

92 90

	a.	b.	c.	d.	e.
1.			✓		
2.		✓			
3.			✓		
4.		✓			
5.			✓		
6.			✓		
7.		✓			
8.					
9.	✓			✓	
10.			✓		
11.		✓			
12.			✓		
13.				✓	
14.			✓		
15.					
16.	(2)	~~(1)~~ 3	~~(3)~~ 1	✓	
~~17.~~		(b)			
18.	Minimize Time, Maximize Distance, Shield,				
19.	Thyroid Gland.				
20.	10C or x-2180				

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. Hines Date 8/13/91

(b) Type of Interview: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: S. Tonegawa

(e) Authorization Reference: CCR-M

(SPHS) 04961

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated _____

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13. "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

R. M. Prosser
Signature

8/13/91
Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

FILM BADGE # 0615 71
SERIES CODE 341
TERMINATION DATE
AUTHORIZATION # CC2 rm
SUPERVISOR S. Tonegawa rm
RPO STAFF D. Hayes
FOR
LAS

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 1/5/94

1. Name Qian ZHUO
(Print) Last First M.I.

2. Social Security Number 469-08-6714 Birth Date 10/08/62

3. Department Cent. Cancer Research Supervisor Susumu Tonegawa PI

4. Faculty _____ Staff _____ Student _____ Other _____

Title Postdoc.

5. Office No. E17-358 Ext. 253-6551 Lab No. _____ Ext. 253-

6. Project Supervisor _____

7. Brief description of present work with radiation:

Using ^{32}P and/or ^{35}S to generate probes for DNA analysis.

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P dCTP			100 μCi
^{35}S dCTP			10 μCi

9. Radiation producing equipment to be used in your present work:

Type _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{32}P	^{35}S	^{3}H	^{14}C		
GREATEST ACTIVITY USED	1mCi	100μCi				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Prof. Eric R. Kandel Center for Neurobiology & Behavior Columbia Univ. 722 W 168th St. NY. NY 10032					9/90	11/93

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

1/5/94
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hall Date 1/5/94

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: CCR-M Supervisor: S. TUNNELAWA

Date Terminated: _____ Date Reactivated: _____

Film Badge: Yes ✓ No _____ : Body ✓ Wrist _____ Finger _____

Spare Badge # 01761 Reference # 69522CID Issue Date 1/6/94 Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No ✓ :

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

85%

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. C
2. b
3. C
4. b
5. C
6. C
7. C B
8. d
9. C D
10. A
11. A D
12. C
13. d
14. b > a > c
15. C
16. b
17. D d unless there are isotope in the place. then my answer is b.
18. ① minimize time, ② keep distance as far as possible ③ Shield it
19. ~~shielding~~, shield with lead. work in the hood.
20. 3-2360

FOR OFFICE USE ONLY

LAST [redacted]

AUTHORIZATION # CCR-09

SUPERVISOR Tonegawa

RPO STAFF D Ethers

FILM BADGE # 6443

SERIES CODE 841

TERMINATION DATE

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date July 8, 1993

1. Name SASAOKA (Print) Last TOSHIKUNI First M.I.
2. Social Security Number 020769241 Birth Date Nov./02/1961
3. Department Center For Cancer Research Supervisor Prof. Tonegawa
4. Faculty ____ Staff ____ Student ____ Other Postdoctoral Associate
   Title Postdoctoral Associate
5. Office No. E17-353 Ext. 6522 Lab No. E17-358 Ext. 2276
6. Project Supervisor Prof. Susumu Tonegawa
7. Brief description of present work with radiation:

   Radio-labeling of DNA and/or RNA

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P ^{35}S			

9. Radiation producing equipment to be used in your present work:

   Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{32}P	^{35}S				
GREATEST ACTIVITY USED	500 μCi	60 μCi				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Department of Neuroscience, Tufts University School of Medicine, 136 Harrison Avenue, Boston, MA 02111					12/1/92	6/30/93

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Toshikuni Sasaoka
Signature

7/9/93
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hmo Date 7/9/93

Type of Interview: Radioisotope ✓ X-Ray _____ Reactor _____ Accelerator _____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual _____ Other _____

Authorization No.: CCR-m Supervisor: Tonegawa

Date Terminated: _____ Date Reactivated: _____

Film Badge: Yes ✓ No _____ : Body ✓ Wrist _____ Finger _____

Spare Badge # 04960 Reference # 1561.140- Issue Date 7/15/93 Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Spare Badge # _____ Reference # _____ Issue Date _____ Termination Date _____

Bioassay: Yes _____ No ✓ :

Urinalysis _____ Radionuclides _____

In vivo Measurements: Whole Body _____ Thyroid _____

95% EXAM III

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. C
2. b.
3. c.
4. b
5. c
6. c
7. b.
8. d.
9. d.
10. b. a
11. d.
12. c
13. d.
14. c) → a) → b)
15. c
16. b
17. b
18. Time Distance shielding
19. Thyroid Baseline measurement of thyroid
20. 100

3- = 180 or 3-2360

0717

FILM BADGE # [redacted]

SERIES CODE B41

TERMINATION DATE

AUTHORIZATION # CCK-17

SUPERVISOR Drageva

RPO STAFF D. Hao

SHEN, JIE

RP-50
Revised 1/94

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 4/21/95

1. Name Shen (Print) Last Jie First M.I.

2. SSN 231 - 49 - 4143 Birth Date 4 / 17 / 19 64 Sex F☒ M☐

3. Department Biology Supervisor Susumu Tonegawa

4. Faculty ____ Staff × Student ____ Other ____

Title Postdoct. Associate

5. Office No. E 553 Ext. 3-6512 Lab No. ____ Ext. ____

6. Project Supervisor Susumu Tonegawa

7. Brief description of present work with radiation:

pulse chase with 3H labels, etc.

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{3}H ^{32}P ^{35}S ^{14}C			

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Have you had previous experience with radioactive material?

☒ Yes {Fill out form RP-59, and the information requested below} ☐ No

RADIONUCLIDE(S)	^{32}P	^{35}S	^{3}H			
GREATEST ACTIVITY USED	50 mCi					
EMPLOYER(S) NAME & ADDRESS (Note: This information is required for workers monitored for occupational radiation dose during the current year.)					DATES FROM	TO
* List most recent first *						
University of Virginia, Charlottesville, VA 22901					8/89	4/95

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

4/21/95
Date

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. HAES Date 4/21/95

Type of Interview: ☑ Radioisotope ☐ X-Ray ☐ Reactor ☐ Accelerator

Instruction Material(s) Supplied: ☑ RPO Required Procedures ☐ Reactor RPO Manual

☑ Information Sheets ☑ Regulatory Guides 8.13 and 8.29 ☑ MIT RPC Policy Regarding Pregnant Workers

☐ Other _____

Authorization No.: CCR-M Supervisor: S. TONGAWA

Date Terminated: _____ Date Reactivated: _____

External Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☒ Requested by user

Internal Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☐ Requested by user

☒ Body ☐ Wrist ☐ Finger

☐ Urinalysis: Radionuclides _____
☐ Whole Body ☐ Thyroid

Reference # 2694526F Spare Badge # 04005 Issue Date 4/25/95 Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

☐ Summary of annual dose report required per 10 CFR 19.13(b)

☑ Prior dose history request sent by: _____ 5/1/95
(name) (date)

9590

RADIATION SAFETY INSTRUCTION QUIZ II

Use this form to record your answers by marking the box next to the selected answer.

DO NOT MARK THE QUIZ !!

Record the Exam Number: 2

1.	☐ a	☐ b	☐ c	☐ d
2.	☐ a	☐ b	☐ c	☐ d
3.	☐ a	☐ b	☐ c	☐ d
4.	☐ a	☐ b	☐ c	☐ d
5.	☐ a	☐ b	☐ c	☐ d
6.	☐ a	☐ b	☐ c	☐ d
7.	☐ a	☐ b	☐ c	☐ d
8.	☐ a	☐ b	☐ c	☐ d
9.	☐ a	☐ b	☐ c	☐ d
10.	☐ a	☐ b	☐ c	☐ d
11.	☐ a	☐ b	☐ c	☐ d
12.	☐ a	☐ b	☐ c	☐ d
13.	☐ a	☐ b	☐ c	☐ d
14.	☐ a	☐ b	☐ c	☐ d
15.	☐ a	☐ b	☐ c	☐ d
16.	☐ a	☐ b	☐ c	☐ d
17.	☐ a	☐ b	☐ c	☐ d
18.	☐ a	☐ b	☐ c	☐ d
19.	☐ a	☐ b	☐ c	☐ d
20.	☐ a	☐ b	☐ c	☐ d

FILM BADGE # 06843

SERIES CODE 841

TERMINATION DATE

AUTHORIZATION # CC12-M

SUPERVISOR S. Tonegawa

RPO STAFF D. Hayes

WANG, YANYAN

RP-50
Revised 1/94

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

SECTION I

Date 10/14/94

1. Name WANG (Print) Last YANYAN First M.I.

2. SSN 049-78-7114 Birth Date 1/8/1957 Sex F☒ M☐

3. Department Biology Supervisor Dr. S. Tonegawa

4. Faculty ____ Staff ____ Student ____ Other ✓

Title Postdoctoral Fellow

5. Office No. E17-358 Ext. ____ Lab No. E17-353 Ext. 3-2276

6. Project Supervisor Dr. S. Tonegawa

7. Brief description of present work with radiation:
Molecular cloning of neural gene

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT
^{32}P ^{35}S	3 mCi	dCTP dATP	10 μCi

9. Radiation producing equipment to be used in your present work:

Type ____ Maximum energy ____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Have you had previous experience with radioactive material?

☐ Yes {Fill out form RP-59, and the information requested below} ☒ No

RADIONUCLIDE(S)						
GREATEST ACTIVITY USED						
EMPLOYER(S) NAME & ADDRESS (Note: This information is required for workers monitored for occupational radiation dose during the current year.)					DATES FROM	TO
* List most recent first *						
Salk Institute, Dr. Chuck Stevens					6/1990	7/94
Yale University, Dr. G. K. Aghajanian					9/83	6/90

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Signature

10/14/94
Date

SECTION III · TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. HAES Date 10/14/94

Type of Interview: ☒ Radioisotope ☐ X-Ray ☐ Reactor ☐ Accelerator

Instruction Material(s) Supplied: ☐ RPO Required Procedures ☐ Reactor RPO Manual

☐ Information Sheets ☒ Regulatory Guides 8.13 and 8.29 ☒ MIT RPC Policy Regarding Pregnant Workers

☐ Other _____

Authorization No.: CCR-M Supervisor: S. DUBAWA

Date Terminated: _____ Date Reactivated: _____

External Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☒ Requested by user

☒ Body ☐ Wrist ☐ Finger

Internal Radiation Monitoring:
☐ Required by 10 CFR 20.1502
☐ Required by MIT NRC License Conditions
☐ Requested by user

☐ Urinalysis: Radionuclides _____
☐ Whole Body ☐ Thyroid

Reference # 4717 Spare Badge # 640 83415 Issue Date 10/24/94 Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

Reference # _____ Spare Badge # _____ Issue Date _____ Termination Date _____

☐ Summary of annual dose report required per 10 CFR 19.13(b)

☐ Prior dose history request sent by: _____ _____
(name) (date)

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers by marking the box next to the selected answer.

100%

DO NOT MARK THE QUIZ !!

Record the Exam Number: I

1.	☐ a	☐ b	☑ c	☐ d
2.	☐ a	☑ b	☐ c	☐ d
3.	☐ a	☐ b	☑ c	☐ d
4.	☐ a	☐ b	☑ c	☑ d
5.	☐ a	☐ b	☑ c	☐ d
6.	☐ a	☐ b	☑ c	☐ d
7.	☐ a	☐ b	☐ c	☑ d
8.	☐ a	☐ b	☑ c	☐ d
9.	☐ a	☑ b	☐ c	☐ d
10.	☐ a	☐ b	☑ c	☐ d
11.	☐ a	☑ b	☐ c	☐ d
12.	☐ a	☐ b	☑ c	☐ d
13.	☐ a	☑ b	☐ c	☐ d
14.	☐ a	☑ b	☐ c	☐ d
15.	☐ a	☐ b	☐ c	☑ d
16.	☐ a	☐ b	☑ c	☐ d
17.	☐ a	☑ b	☐ c	☐ d
18.	☐ a	☐ b	☐ c	☑ d
19.	☐ a	☐ b	☑ c	☐ d
20.	☑ a	☐ b	☐ c	☐ d

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date 11/28/89

1. Name WU MIN (Last (Print) / First / M.I.) Birth Date 10/15/61
2. Social Security Number 101-68-4494 Faculty Title
3. Department BIOLOGY AND CANCER CENTER Staff Title
4. Office No. Ext. Job Title POSTDOCTORAL FELLOW
5. Lab. No. E17-354 Ext. x 6435 Student Year:
6. Project Supervisor SUSUMU TONEGAWA
7. Brief description of present work with radiation:

^{3}H- and ^{32}P Labeling of Nucleic Acids

^{35}S-Labeling of Nucleic Acids

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amoun to be used per experiement
^{3}H	1mC		
^{35}S	<1		

9. Radiation producing equipment to be used in your present work: N/A

Type: Maximum energy

AUTHORIZATION # CCR-11-3 FILM BADGE # 05138
SUPERVISOR S TONEGAWA SERIES CODE B11
RPO STAFF D. HAYES TERMINATION DATE
LAST NAME WU

WU MIT OFFICE USE ONLY

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled		^{32}P	^{35}S	^{3}H					
Largest quantity handled									

Name and Addresses of Employers	Dates	
	From	To
MARTIN A. GOROVSKY, DEPT. OF BIOLOGY, UNIV. OF ROCHESTER ROCHESTER NY 14627	1954	1959

2. Previous experience with radiation producing equipment: NONE

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		X	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		X	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

95%

	a.	b.	c.	d.	e.
1.		X			
2.			X		
3.		X			
4.			X		
5.		X			
6.			X		
7.			X		
8.		X			
9.				X	
10.			X		
11.				X	
12.				X	
13.	X				
14.				X	
15.			X		
16.		X			
17.			(c.)	X	

18. TIME, distance and shielding

19. thyROID GLAND

20. 100

(To be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 11/28/89

(b) Type of Interiew: Radioisotope ✓ Laser ____ X-Ray ____ Reactor ____ Accelerator ____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual ____

Regulatory Guides 8.13 and 8.29 ✓ Other ____

(d) Supervisor for radiation protection training: S. TANEGAWA

(e) Authorization Reference: CCR-M-3

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist ____ Finger ____ Badge # 341

Dates monitoring badge issued ____, terminated ____

(g) (Yes, No) Bioassays: Urinalysis ____ Radionuclides ____

In Vivo Measurements: Whole Body ____

Thyroid ____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Signature

11/25/89
Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ (Last) _____ (First) _____ (M.I.) Date of Birth _____

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period From	Period To	Employer and location	Whole body Exposure (rem)
	TOTAL		

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____

B. Monitoring badge not required ☐

C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised: 12/88

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENVIRONMENTAL MEDICAL SERVICE

RADIATION PROTECTION OFFICE

REGISTRATION AND RADIATION RECORD

SECTION I

Date April 4, 89

1. Name XU MING (Last (Print) / First / M.I.) Birth Date Aug 22, 60
2. Social Security Number 455-59-7098 Faculty Title
3. Department Biology Staff Title Post Doc Fello
4. Office No. E17-353 Ext. 8-6439 Job Title
5. Lab. No. E17-353 Ext. 8-6439 Student Year:
6. Project Supervisor Prof S. Tonegawa.
7. Brief description of present work with radiation:

I-125 / P-32 label DNA / RNA / protein for Biological Analysis.

8. Principal radioactive material to be used in your present work:

Radionuclides	Amount to be obtained in millicuries	chemical and physical form of material to be obtained	maximum amou to be used per experiement
[^{32}P]	1.0		0.2 M
[^{125}I]	0.5		0.2 M

9. Radiation producing equipment to be used in your present work:

Type: _____ Maximum energy _____

FOR OFFICE USE ONLY:

LAST NAME XU, AUTHORIZATION # CCR-M-3 FILM BADGE # 04874
SUPERVISOR TONEGAWA SERIES CODE 841
RPO STAFF D. Hayes TERMINATION DATE

XU, Ming

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

Radionuclides handled									
Largest quantity handled	[^{32}P] 1 mCi								

Name and Addresses of Employers	Dates	
	From	To
W. T. Gurrard Ph.D. Dept. Biochemistry U.T. Southwestern Dallas, TX 7[illegible]23	1983	1989

2. Previous experience with radiation producing equipment:

Types of Equipment	Names and Addresses of Employers	Dates	
		From	To

	Yes	No	Unknown
3. Have you had internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure?		✓	
4. Has your occupational exposure to external radiation totalled more than 5 rem (or 5 rad) in any one year?		✓	

RADIATION SAFETY INSTRUCTION

Quiz Answer Sheet

Use this form to record your answers. DO NOT MARK THE QUIZ BOOK.

85 50

	a.	b.	c.	d.	e.
1.		(b)		✓	
2.			✓		
3.		✓			
4.	✓		(c)		
5.		✓			
6.		✓	(c)		
7.			✓		
8.		✓			
9.				✓	
10.	(a)	✓			
11.				✓	
12.		(b)		✓	
13.	✓			✓	
14.			(d) ✓		
15.					
16.		✓			
17.			✓		

18. time / distance / shield.

19. thyroid / protein's / check afterwards.

20. (60

SECTION III (to be completed by Radiation Protection Office)

1. (a) Interviewed by D. HAES Date 4/4/89

(b) Type of Interiew: Radioisotope ✓ Laser _____ X-Ray _____ Reactor _____ Accelerator _____

(c) Instruction Material Supplied: Required Procedures ✓ Information Sheets ✓ Reactor RPO Manual _____

Regulatory Guides 8.13 and 8.29 ✓ Other _____

(d) Supervisor for radiation protection training: TUNECAWA

(e) Authorization Reference: CCR-M-3

(Note: Interviewer will circle Yes or No for each item below)

(f) (Yes, No) *Badge: Body ✓ Wrist _____ Finger _____ Badge # _____

Dates monitoring badge issued _____, terminated _____

5355 8A, 02732

(g) (Yes, No) Bioassays: Urinalysis _____ Radionuclides _____

In Vivo Measurements: Whole Body _____

Thyroid _____

(h) I have received and read the M.I.T. "Required Procedures for Radiation Protection" including Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." I have attended the R.P.O. radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures. I agree to comply with 1) all applicable M.I.T. rules and regulations governing safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the M.I.T. Radiation Protection Committee.

Xu, Ming — Signature

April 4, 89. — Date

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SUMMARY RECORD OF OCCUPATIONAL RADIATION EXPOSURE

I. Name _____ Date of Birth _____
Last First M.I.

Social Security # _____

II. Summary of previous (non M.I.T.) occupational Exposure:*

Period		Employer and location	Whole body Exposure (rem)
From	To		
		TOTAL	

* (Based on information supplied by individual and their employers)

III. Summary of Occupational Exposure Received at M.I.T.:

A. Period of exposure: From: _____ To: _____, From: _____ To: _____
B. Monitoring badge not required ☐
C. Record of exposure: **(Note: Zero results mean no detectable exposure)**

(1) External Exposure in rem units. (Measured by Film Badges _____ TLD _____)

Monitoring period											Totals
Penetrating whole body											
Skin of whole body											
Wrist											
Finger											

(2) Internal exposure as measured by bioassay or in-vivo measurements:

Type of measurement	Date of measurement	Radionuclide observed	Results of Measurements

IV. Comments:

V. Radiation Protection Office Staff Member _____ Date _____
(Signature)

RP-50
Revised 4/93

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL MEDICAL SERVICE
RADIATION PROTECTION OFFICE

RADIATION WORKER REGISTRATION FORM

FOR OFFICE USE ONLY:

LAST NAME [redacted] ZACKS, REBECCA L.

AUTHORIZATION # CCR-82

SUPERVISOR Tonegawa

RPO STAFF D. Hess

FILM BADGE # 06724

SERIES CODE 841

TERMINATION DATE _____

SECTION I

Date 8.4.94

1. Name ZACKS (Print) Last REBECCA First L M.I.

2. Social Security Number 382-68-1565 Birth Date 8.18.72

3. Department CCR Supervisor Susumu Tonegawa

4. Faculty _____ Staff ✓ Student _____ Other _____

Title technical assistant

5. Office No. _____ Ext. _____ Lab No. E17-353 Ext. x6439

6. Project Supervisor _____

7. Brief description of present work with radiation:

8. Principal radioactive material to be used in your present work:

RADIONUCLIDE(S)	TOTAL ACTIVITY ORDERED (mCi)	CHEMICAL OR PHYSICAL FORM ORDERED	MAXIMUM AMOUNT USED PER EXPERIMENT

9. Radiation producing equipment to be used in your present work:

Type _____ Maximum energy _____

SECTION II PREVIOUS EXPERIENCE WITH RADIATION

1. Previous experience with radioactive material:

RADIONUCLIDE(S)	^{3}H	^{32}P				
GREATEST ACTIVITY USED	.01 mCi	.5 mCi				
EMPLOYER(S) NAME & ADDRESS					DATES FROM	TO
Brown University Providence, RI 02912					6.93	8.94

2. Previous experience with radiation producing equipment:

TYPE(S) OF EQUIPMENT	EMPLOYER(S) NAME & ADDRESS	DATES FROM	TO

3. Have you had an internal radiation exposure in amounts known (or suspected) to be above the permissible limits for occupational exposure? YES (NO) UNKNOWN

4. Has your occupational exposure to external radiation totalled more than 500 mrem (or 500 mrad) in any one year? YES (NO) UNKNOWN

I have received and read the MIT *Required Procedures for Radiation Protection* including Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*. I have attended the RPO radioactive materials safety course and was afforded the opportunity to ask questions addressing any concerns I have relating to potential occupational radiation exposures.

I agree to comply with 1) all applicable MIT rules and regulations governing the safe use of radioactive materials and 2) the conditions of approval listed on my project authorization, approved by the MIT Radiation Protection Committee.

Rebecca L Zadnik
Signature

8.4.94
Date

84/90

ANSWER SHEET

1. C
2. C
3. CA
4. BD
5. B
6. a. 2
   b. 1
   c. 3
   d. 4
7. D
8. D
9. B
10. DC
11. A
12. B
13. C
14. A
15. A
16. B
17. C
18. D
19. A
20. C
21. D
22. D
23. D
24. BC
25. D

Name: Rebecca Zacks Date: 9/27/95

Lab: Tonegawa Phone: 3-6431

SECTION III TO BE COMPLETED BY THE RADIATION PROTECTION OFFICE

Interviewed by: D. Hines Date 8/4/94

Type of Interview: Radioisotope ✓ X-Ray ____ Reactor ____ Accelerator ____

Instruction Material Supplied: RPO Required Procedures ✓ Information Sheets ✓

Regulatory Guides 8.13 and 8.29 ✓

Reactor RPO Manual ____ Other ____

Authorization No.: CCR-m Supervisor: S. TONEGAWA

Date Terminated: ____ Date Reactivated: ____

TRAINED Gamma-Cell 40 9/27/95

Film Badge: Yes ✓ No ____: Body ✓ Wrist ____ Finger ____

Spare Badge # 04968 Reference # 4425236 Issue Date 8/10/94 Termination Date ____

Spare Badge # ____ Reference # ____ Issue Date ____ Termination Date ____

Spare Badge # ____ Reference # ____ Issue Date ____ Termination Date ____

Bioassay: Yes ____ No ✓:

Urinalysis ____ Radionuclides ____

In vivo Measurements: Whole Body ____ Thyroid ____

100%
Extra #1

RADIATION SAFETY INSTRUCTION QUIZ

Use this form to record your answers. **DO NOT MARK THE QUIZ !!**

1. c
2. b
3. c
4. d
5. c
6. c
7. d
8. c
9. b
10. c
11. b
12. c
13. d
14. b
15. d
16. c
17. b
18. d
19. c
20. a

10-95-36

RADIATION PROTECTION TRAINING PROGRAM

Outline of Subject Material

1. **Concepts of Ionizing Radiation**

2. **Units of Radioactivity and Radiation**

   A. Radioactivity
   B. Activity (Curie, Becquerel)
   C. Exposure (Roentgen)
   D. Absorbed Dose (Rad, Gray)
   E. Dose Equivalent (Rem, Seivert)
   F. Dose Rate
   G. Half Life
   H. Radioactive Decay Process
      - Alpha, Beta, Gamma ray, X-ray

3. **Biological Effects of Radiation:**

   A. History of Radiation Exposure

   B. Acute vs. Chronic Exposure

   C. Threshold vs. Linear Relation Between Dose and Effect

   D. Balancing Risk vs. Benefit

   E. Regulatory Guide 8.29

4. **Maximum Permissible Exposures:**

   A. Current MPE Values
      - External and Internal Exposures

   B. Concept of ALARA

   C. Natural Background Radiation Exposures.

   D. Occupational Exposures

   E. Regulatory Guide 8.13

5. Measurement and Control of Radiation Exposures:

A. External Exposures
- Time
- Distance
- Shielding

B. Internal Exposures
- Ventilation
- Engineering controls
- Glove Boxes
- Iodination Hoods

C. Dosimeters
- Film badges
- TLD Ring Dosimeters

D. In Vivo Measurements
- Whole Body Burden Measurements
- Thyroid Burden Measurements

6. Radiation Survey Techniques:

A. Wipe Tests

B. Radiation Survey Instruments
- Geiger Mueller detectors
- NaI Scintillation detectors

C. Radioactivity Analysis
- Liquid Scintillation Counting
- Gamma Counting

D. Environmental Monitoring
- Environmental Air Sampling
- Breathing Zone Sampling

7. Handling Radiation Emergencies

A. Emergency Procedures

B. Decontamination Techniques

8. Waste Disposal Techniques

- Segregation by Radiological Half Life
- Sanitary Sewerage Disposal Rules
- Liquid Scintillation Vial Disposal
- Animal Carcass Disposal
- Mixed Waste Disposal

9. Safe Handling Techniques

- General Radiation Laboratory Rules
- Specific Radiation Laboratory Rules
  Phosphorus 32
  Iodine 125

10. Compliance with Regulations:

A. NRC license Conditions of Approval

B. Title 10 CRF Parts 19 & 20

C. Massachusetts Department of Radiation Control

D. DOT Regulations: Title 49 CFR

Appropriate reference material will be distributed at the time of the training lectures to further reinforce the above concepts. Slide shows, video tapes, and hands on demonstrations will also be used to reinforce above concepts.