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### 1. Opening

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**Nagata:** Hello, my name is Koh Nagata. I am a post doc fellow at the iCeMS. This iCeMS Crosstalk presents two iCeMS scientists each time – one as the interviewee, the other as the interviewer. Today's researcher is Dr. Shinya Yamanaka, professor of the iCeMS, and also director of the Center for iPS Cell Research and Application.

Nice to meet you, Dr. Yamanaka.

**Yamanaka:** Nice to meet you.

### 2. Scientific Career

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**Nagata:** You started your career as a medical doctor, an orthopedist, so you know a lot about human body. And then you turned your way to the basic research. I am now working on the proteins called ABC proteins, and I usually use cultured cells in experiments. So, I can analyze what is happening inside a cell, in the cell level, but I can't imagine what is happening in the tissues or at whole body levels. ABC proteins are associated with various diseases such as cystic fibrosis or atherosclerosis. Therefore, I think I should have a point of view to understand whole body. Would you tell me how the experience as a medical doctor influences your view or motivation for research?

**Yamanaka:** Well, my career as an orthopedic surgeon has a great impact on my career as a scientist. First of all, I always think about patients, so I want to be helpful for patients. So my research goal tends to be very practical. I want to be more helpful for patients. So that is one impact on my whole career. The other thing is that because I used to be a surgeon, I tend to think things very simply. Many scientists, I think, tend to think in a

complicated manner, but I think I tend to see various things from a very simple point of view. In this particular case, I mean, in the generation of iPS cells, that simple way of thinking worked very well.

### 3. Post America Depression

**Nagata:** From 1993 to 1996, you were working at the Gladstone Institute in the United States. And after you came back to Japan, I heard that you were really depressed, as you call it “Post America Depression (PAD)”. You couldn’t wake up in the morning, and you even thought of quitting research and going back to the clinical practice. How did you recover from such tough situation?

**Yamanaka:** Well, I had a hard time. I was suffering from PAD, but I was lucky to be recruited as a principle investigator at the Nara Institute of Science and Technology in 1999. That was a great change to me. Before that point, I was working by myself. I didn’t have any students or any post docs.

**Nagata:** No discussions?

**Yamanaka:** No discussions.

**Nagata:** I think discussion is one of the most interesting things in research and to build hypothesis is very interesting. But sometimes we will be too dreamful. Does it matter?

**Yamanaka:** If you have to do your research by yourself, you can be selfish or you have to evaluate it by yourself. But if you have some other, even students or some other scientists, you can discuss with them and you can evaluate each other. I think that is very important.

### 4. Study Abroad

**Yamanaka:** Speaking of PAD, have you ever studied abroad or do you have a plan to spend some time after your post doc?

**Nagata:** I have never been abroad for study. I would like to go abroad some time. But I’m afraid that I might not be able to come back to Japan with a position, so I hesitate now.

You were happy in the United States?

Yamanaka: I was very happy. But, you know, when I was a student or when I was a post doc, there were many things which we were able to do only in the States or in the U.K., not in Japan. But now that the standard of Japanese science has become much higher, almost comparable to that in the States or in the U.K, from that point of view, from that reason, you don't have to go abroad. You can stay in Japan. But, nevertheless, I strongly recommend many young scientists spend a year or two in foreign countries. You can only learn those cultural differences if you spend a few years abroad, so I really recommend it.

Nagata: You also say that you learned how to present, the method of presentation, in the United States.

Yamanaka: Yes, yes, it is very important. For scientists, to be successful, doing good experiments means probably 50% and the remaining 50% depends on how you present your data, your experiments. So you really have to learn how to present your own data. That makes a huge difference in publishing the data and also in finding a new position, so that is very important.

## 5. Long-Term Vision

Nagata: In research, things do not always go as planned, and we may experience hard days without any data for a long time, maybe for years. I think it's very difficult to decide whether to continue working on one project, or when to give it up. While you were trying to generate iPS cells, did you ever think of giving it up before you identified 24 candidate genes?

Yamanaka: Well, making iPS cells has been my long-term goal, so I have never thought of quitting that. But to achieve the long-term goal, we have to attain many short-term goals. Attaining the long-term goal is difficult. You cannot do it in a day, and you have to take multiple steps. It's like a long way. So, you have to have a clear view. Actually, that is one of my favorite sentences, and words from my boss, "VW". V stands for a vision and W stands for hard work. In order to succeed, you have to keep VW in mind. You have to have a clear vision and you have to work hard. We, Japanese tend to work hard. But, at the same time, we tend to forget a clear vision. Sometimes you end up doing many experiments without having any purposes.

**Nagata:** How did you get your clear vision?

**Yamanaka:** First of all, you have to realize that you have to have a clear vision. So, you always ask yourself “What is my vision?”, or “What is my long-term vision?” You keep asking that question and the answer should be always the same. If you have a clear vision, the answer to the question is always the same. But when I ask my students what their long-term goal or long-term vision is, they tend to answer something different every day. That means they don’t have a clear vision. I think the first step is to ask yourself what your vision is and if you can answer the same vision every day, you are OK.

## 6. What Makes Him Happy

**Nagata:** Finally, may I ask when do you feel happy in your research activities?

**Yamanaka:** When I was a post doc, when I was doing scientific research by myself, I was very happy when I found something new or something unexpected. But now that I have many young students and young fellows, I feel much happier when those students or fellows find something really unexpected from their own ideas. So, watching those young scientists who were very immature when they came to my laboratory, growing up, becoming good scientists and producing exciting data from their own ideas is the greatest moment to me.

## 7. Closing

**Nagata:** Now that will be all for the 1st iCeMS Crosstalk. Thank you very much.

Directed by	iCeMS Science Communication Group: Eri Mizumachi, Kei Kano
Edited/Designed by	iCeMS Int'l PR Office: Yutaka Iijima, Ayumi Hagusa
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