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Entering into the world of research, fascinated by the lifestyle of my respected mentors who enjoyed pure pursuit of sciences

So far Dr. Furukawa has met a number of wonderful people and enjoyed engaging in research in various places. He sincerely wishes that his students never forget the “joy of thinking” no matter how small or trivial the theme in question may seem. His experience of continuing research on metalloproteins, an interdisciplinary field between biochemistry and inorganic chemistry, makes him keenly aware of the importance of maintaining an interest in various fields of study.

What was your childhood like?

As an elementary schoolboy, I spent almost everyday playing baseball with my friends till dark immediately after coming back home from school. I wanted to become a professional star player at the Hanshin Tigers team in the future. I really meant it. I was also fond of insects and other living things. After school, I would go to a nearby open space to catch grasshoppers or to a rice paddy or irrigation canal to catch tadpoles and crayfish.

Although I was not so much interested in school studies, as an elementary school fifth or sixth grader, I was unexpectedly awakened to the “fun of thinking.” Mr. Goto in charge of our class at the time was a teacher of a somewhat peculiar type, who let us elementary school students think about the relationship between the brightness of stars and their distances to the Earth, or taught us about various properties of atoms using a periodic table of the elements. What’s more, he would often take us outdoors to let us understand the importance of observing and experiencing things in the field. Looking back at those days, I think these experiences might have been too advanced in content for us, but we could feel the fun of learning firsthand.

Why did you find an interest in chemistry?

During my junior and senior high school days, I was fortunate enough to be in an environment surrounded by bright people who did not try to rush at solving problems, but solved problems exquisitely after thinking them through. This, I think, led me to awaken to the fun of learning.

I still remember one day. During a chemistry class on the electronic theory of organic chemistry, I was fascinated by its clear-cut approaches. I was greatly motivated to study this simple, beautiful field – chemistry – more deeply and chose to learn at Kyoto University with a good reputation for chemistry.

At Kyoto University, however, I did not attend classes so diligently because the university in those days allowed its students to graduate only if they pass exams. So, I learned chemistry mainly by reading a variety of textbooks. Instead, I would actively take part in reading circles of Latin and German language seminars while also attending other seminars on the campus as an audit student. Thus I exposed myself to studies other than chemistry, which later proved to be very good experiences. By doing so, I was also able to make a number of good friends, with whom I fully enjoyed my campus life. In retrospect, however, it’s a pity I missed many of the classes by prominent professors representing Japan’s chemistry learning.

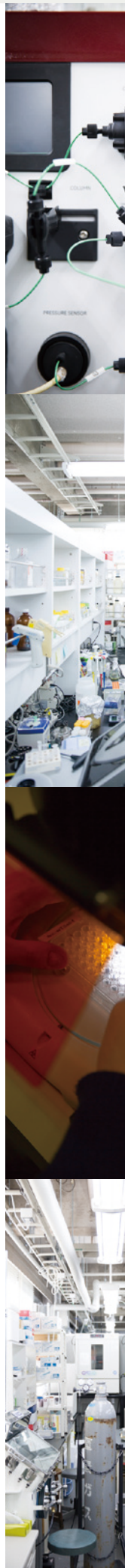
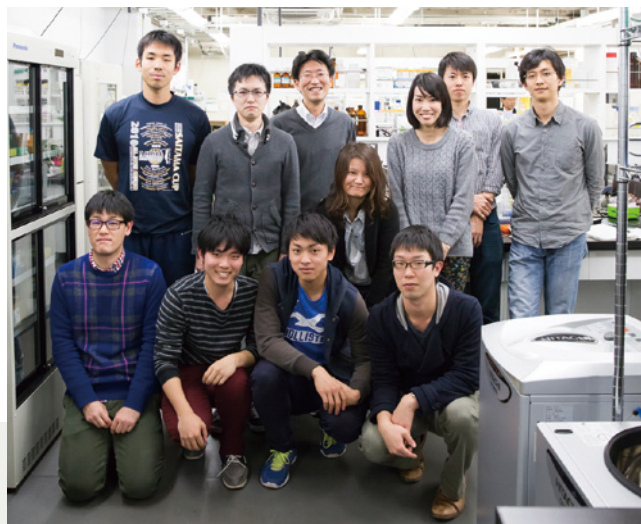
What motivated you to enter into the world of research?

The origin of my academic career is Prof. Isao Morishima’s lab, to which I was assigned as an undergrad. Back in those days, I already became interested in both biochemistry for molecular-level understanding of life phenomena and coordination chemistry that describes reactivity of molecules using molecular orbitals (MO’s). I was happy joining the Morishima lab and was able to satisfy both of my interests because the lab focused on the structure-function relationship of hemoproteins – an interdisciplinary area between proteins and metal complexes. In addition, the figure of Prof. Morishima that I saw when I visited the lab to look at it for the first time was so impressive I cannot forget it even today. Comfortably sitting on a large chair and smoking a pipe, he eagerly explained hemoglobin reactivity by the molecular orbitals of heme, which was truly inspiring.

Despite some difficulties and distress experienced in the course of research, every day was really fulfilling – developing hot discussions with all lab members while writing this and that on white boards set up here and there within the lab. I’d also like to mention the then assistant professor Koichiro Ishimori, who thoroughly taught me how to communicate one’s idea to others, including how to write (not to mention scientific papers) and how to make a presentation at scientific meetings. I owe much to him for what I am today as a researcher.

What course of life did you have in mind after graduation?

So devoted to experiments, discussions and presentations, finding employment with a business was the very last thing I could think of. I suddenly found myself in the third year summer of the doctoral course without any plan for the future – a crisis situation. Thanks to recommendations from many professors, however, I was able to study under Prof. Thomas O’Halloran of





Understanding of metalloproteins requires knowledge of sciences across the board. It's, therefore, important to expose yourself to as many fields of learning as possible from your earlier years.

Yoshiaki Furukawa

Born in Hyogo Prefecture, Dr. Furukawa specializes in bioinorganic chemistry, focusing on the roles metalloproteins play in physiological and pathological phenomena. He completed the doctorate course at Kyoto University Graduate School of Engineering and obtained a doctorate degree (Dr. Eng.). After serving Northwestern University of the United States and the RIKEN Brain Science Institute as a postdoctoral fellow, he joined Keio University Department of Chemistry as an associate professor (non-tenured) in April 2010, then assumed the current post in April 2015.



Northwestern University who was active and world-renowned for his research in copper chaperone. I thought I might be able to shed some light on life phenomena and the development of various diseases if, in the course of my research in copper chaperone, I could clarify interactions between proteins and metal ions. This idea continues to be the source of energy behind my current research activities.

"Everything should be as simple as possible, but not simpler." Prof. O'Halloran often cited this remark of Albert Einstein. While Prof. O'Halloran is currently engaged also in other projects, I'm overwhelmed by his ability to come up with one innovative idea after another. He advised me, saying "Don't be afraid of creating new ideas, but just enjoy it." Thanks to this encouraging advice, I'm coming to enjoy my research work even more.

Later, I joined Dr. Nobuyuki Nukina's research team at RIKEN Brain Science Institute in Japan. Dr. Nukina was one of the few neurologists, who were attempting to understand the pathologies of neurodegenerative diseases by focusing on structural changes in proteins. Even today, he sticks to basic studies. As a member of his team, I was privileged to freely use cultured cells and experimental models like mice and rats I had never handled before, as well as costly experimental equipment. These experiences helped me a lot in honing my experimental skills. In this sense, I may call it the most fulfilling period of my life.

In retrospect, I have been truly blessed with good mentors. Each and every one of my mentors was enjoying their scientific pursuits and their own lives, thus providing me with good role models for my life.

What do you expect of your current students?

I joined Keio University in 2010. Fortunately, I was able to set up my own lab soon thanks to enthusiastic support of Department of Chemistry professors who voiced, "Keio needs to introduce a new field of research."

With alumni of many graduates who are active at the forefront of society, I feel Keio University is a driving force of Japan, so to speak. On one hand, it is wonderful. On the other hand, I'd advise our students not to become too dependent on the Keio brand and

its extensive human network. I'd like my students to develop and exhibit their own individual colors.

Universities are where you should think about your future paths, not a mere waypoint to find employment with big businesses. Prof. Morishima once taught me the phrase "noblesse oblige." This means the noble have their obligations to perform for society. Our students are privileged to enjoy such an enviable environment as Keio. Therefore, they should think more seriously about what they should do to contribute to society, and live their lives with pride.

How do you refresh yourself when you have time to spare from research?

I like languages and letters/characters of the world, so I often take my family to exhibitions and events that interest me. The catalyst for my liking were the ancient Tangut characters that I knew in the novel "Dunhuang" authored by Yasushi Inoue that I read when I was a junior (or senior?) high school student.

I like to travel overseas with persons with whom I can share joy and distress. In fact, I involved my wife to visit various overseas destinations even before our marriage.

As for daily breathers, the best is playing with my daughters, an elementary school girl and a kindergarten student. Simply looking at them is really fun!

◎ Some words from students . . . ◎

● Dr. Furukawa came to Keio in 2010. It just happened to be when I entered Keio. Eager to challenge a research theme dealing with substances like proteins with large molecular weight, I jumped at the Furukawa lab engaged in research in metalloproteins. I'm now in the first year of the doctoral course. Dr. Furukawa puts faith in me and allows me to carry out research as freely as I like, which is encouraging as well as comfortable.

(Reporter & text writer : Akiko Ikeda)

For the full text of this interview

<http://www.st.keio.ac.jp/kyurizukai>