April 2016 Issue No.10

QBiC

NEWSLETTER OF RIKEN Quantitative Biology Center

QBiTs

Splash!

RIKEN President Hiroshi Matsumoto (center left), QBiC Director Toshio Yanagida (center right) and Osaka University President Shojiro Nishio (second from right), joined by government dignitaries, smash open a barrel of sake to celebrate the transfer of the Osaka Bioscience Institute to RIKEN QBiC.

Inside This Issue

CATCHING UP WITH

Katriina Lipponen visits the Masujima Lab

Katriina Lipponen demonstrating single cell MS

Katriina Lipponen returned to QBiC this January for three weeks in Tsutomu Masujima's Laboratory for Single Cell Mass Spectrometry (MS). Katriina, who had spent time in the Masujima lab last year as well, hails from Helsinki, Finland, where she is a researcher for 3iRegeneration. She explains, "3iRegeneration is a project led by Professor Heikki Ruskoaho from the Faculty of Pharmacy at the University of Helsinki. We are developing pharmaceuticals for stem cell and regenerative medical therapies. The project focuses on heart and brain diseases such as heart failure and Parkinson's disease. I work in 3i Analytics."

"I did my Ph.D. on capillary electrophoresis and biosensor quartz crystal microbalance. I was studying how glycoproteins interact with extracellular matrix proteoglycans on microfluidic chips. At 3i Analytics I have been working on combining the microfluidics and single cell MS. We want to see what metabolites stem cells are making in different states but with the number of cell we are working with the conventional methods don't really work."

Katriina spent two weeks in the Masujima lab last year exploring single cell MS technology that could be employed in 3i Analytics. Explaining how the initial visit was arranged, "I found out about Masujima's lab when I was researching single cell MS. Masujima happened to be in Helsinki visiting my Ph.D. advisor. I met him and he agreed to let me come here to learn the method."

During the first visit, "I evaluated the system to see if it would work for us and to see if we should invest in the microscope and micromanipulators" needed for this work.

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Recent Science Events

• Feb 29, 2016 QBiC Seminar
Fumio Motegi & Alexander Bershadsky
Mechanobiology Institute, Singapore

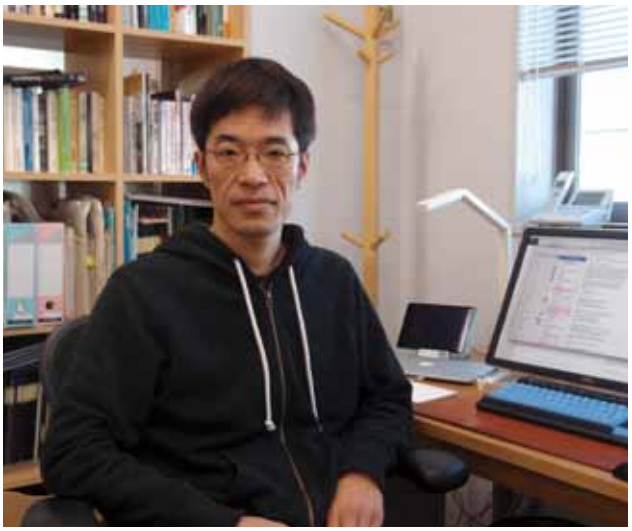
• Feb 24-25, 2016 RIKEN Joint Workshop
Single Cell Workshop

• Feb 1, 2016 Afternoon Seminar
Masayuki Ohzeki, Kyoto University
"Sparse Modeling"

• Jan 15, 2016 QBiC and Science Council of Japan Joint Symposium
"Whole Cell Multimodal Analysis: New Horizon in Integrated Biosciences"

MEET THE LAB

Tatsuo Shibata's Laboratory for Physical Biology



Discovery of the general principles that govern cellular functions and embryonic development is the research aim in my group. To this end we employ strong interactions between experiment and theory.

One of our research topics is the asymmetry in the cell, tissue and body that is essential for a variety of biological processes. Understanding how asymmetry is formed depends on combining mathematical analysis with molecular studies. Cell polarity is one such asymmetry, which is essential for directional cell migration, cell differentiation, and tissue organization.

A major theme for the last five years has been the mechanism of chemotaxis and gradient sensing of single eukaryotic cells, for which cell polarity plays an important role. We have found that cell polarity can be formed in a self-organized manner independent of external asymmetry. We also showed that such cell polarity is essential for gradient sensing.

With groups in RIKEN Center for Developmental Biology, we have also discovered how asymmetry along the dorsal-ventral axis is self-regulated to adjust to different size embryos, and how cellular level asymmetry, such as cell chirality, gives rise to tissue level asymmetry.

HOT OFF THE PRESS

Recent publication from QBiC researchers

◆Yuki Shindo with the K. Takahashi Laboratory for Biochemical Simulation described how ERK signaling changes from "analog to digital" in *Nature Communications.*

◆A collaborative effort from the K. Sumiyama and H.R. Ueda Laboratories found a new short sleeper gene. Get the details on their innovative triple CRISPR and Snappy Sleep Stager technologies in *Cell Reports*.

◆T. Watanabe's Laboratory for Comprehensive Bioimaging created a protein-crowding sensitive fluorescent probe system. Find out more in *Nature Scientific Reports.*

Recent Science Events

• Jan 12, 2016 Unit Closing Presentation
Urs Frey, Frey Initiative Research Unit

• Dec 28, 2015 QBiC, NICT CiNet, FBS, and iFReC Joint Seminar
Ronald Vale & Karen Dell
University of California, San Francisco

• Dec 25, 2015 NICT CiNet and QBiC Christmas Joint Seminar
Takeo Kanade, Carnegie Mellon University

Shiseido Link of Life Features QBiC Researcher

Shuichi Onami (right) with Dai Fujiwara

On October 23, Cosmetics giant Shiseido featured researchers from various research institutions including QBiC's own Shuichi Onami at the Link of Life events associated with Tokyo Design Week. QBiTs sat down with Onami to discuss this event.

You are pictured with Dai Fujiwara at the event. Who is Dai Fujiwara?

Dai Fujiwara is a very famous designer, who previously worked for ISSEY MIYAKE, a world famous Japanese designer brand, as the creative director.

I understand he has worked with RIKEN in the past and may work with RIKEN again in the future.

Yes, he is interested in working with RIKEN. He wrote in his private letter to me that he is interested in creating some dresses using DNA as yarn. It is very much interesting.

And the LINK OF LIFE event you attended, what was that like?

Because the event is held in the center of the Ginza area, many attendees were office ladies who are interested in sophisticated fashion brands and were still in their business attire because they came after work. There were people working with or close to the artists, who wore collection-line dresses, or casual but cool suits. The mixture made a very cool atmosphere.

And your work was displayed in a rather artistic way.

The display and exhibition areas were beautifully prepared and I felt the similar sense of creativity in a high brand shop, like COMME des GARCONS, when they are

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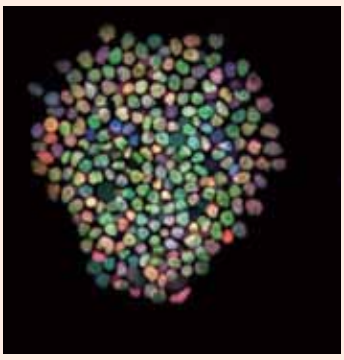
QBiC outreach activities



◆Together with other RIKEN centers in Kobe, QBiC participated in Science Agora 2015, an event open for people from all sectors and all generations. The event was held in Odaiba, Tokyo from November 13 to 15, 2015. The RIKEN booth made an art museum with a dozen artistic pictures picked from the research done in RIKEN Kobe and QBiC including the colorful bead like cluster of ES cells taken by Kazuko Okamoto of the Watanabe lab (photo). The audience voted for their favorite art pieces and the most votes went to the transparent baby mouse.

◆On November 24, Chikara Furusawa gave a seminar presentation at Nishinomiyahama Junior high school in Hyogo prefecture. This seminar was part of the Nishinomiya Yukawa Memorial Award supported by Nishinomiya city. In the past quarter Chikara also continued his cooperation with the multilingual experiential education group, Hippo Family Club. He

OPEN DAYS

RIKEN Osaka

On November 7, QBiC held its first annual open day at the Furuedai campus. This event, which was open to the general public, attracted nearly 250 participants. Members of the community enjoyed lectures and mini-talks from the Furusawa, M. Ueda and Okada laboratories. While Arnaud Germond and other researchers from the Watanabe laboratory (pictured) held science café style, small group discussions. In addition, tours of the laser microscopes and the MDGRAPE-4 supercomputer were extremely popular as were the 3D printed organelles and hands-on 3D printing experience provided by the Iwane laboratory. ■

RIKEN Kobe

QBiC researchers Kenneth Ho and Yusuke Azuma (pictured) and other members of the Onami laboratory along with Ryoji Sekine and members of the Ebisuya laboratory provided interactive science experiences for visitors of all ages at the RIKEN Kobe Open Day. At the same event Yukako Tohsato of the Onami Lab participated in a question and answer session where visitors could interrogate a real scientist! ■

gave a presentation on evolution and cell differentiation.

◆On November 30, Makoto Taiji discussed the MDGRAPE-4 Supercomputer at the 20th "Protein Mall Kansai" information exchange seminar on the role of supercomputers in drug development.

◆Four German researchers visited QBiC on Dec 7, 2015 as part of a tour sponsored by the Japanese Ministry of Foreign Affairs and the German Ministry of Education and Research.

◆On January 31, 2016 the Hyogo science fair was attended by QBiC's Koji Kyoda, researcher in the Onami lab. He was at QBiC's booth to explain about his research using model organism C. elegans. There were a lot of questions from excited students. The science fair in Hyogo took place at Kobe International Exhibition Hall on the Port Island. The event was organized by eight super science high schools in Hyogo prefecture. There were 122 presentations by high school students. There were 54 exhibits from universities and other research institutes. The event attracted 1442 participants.

◆Rikuhiro Yamada, senior scientist in Hiroki Ueda lab, presented recent inovations in life science at the second "Medical Japan" in Osaka on Feb 25, 2016.

Mountain biker's guide to Osaka and Kobe

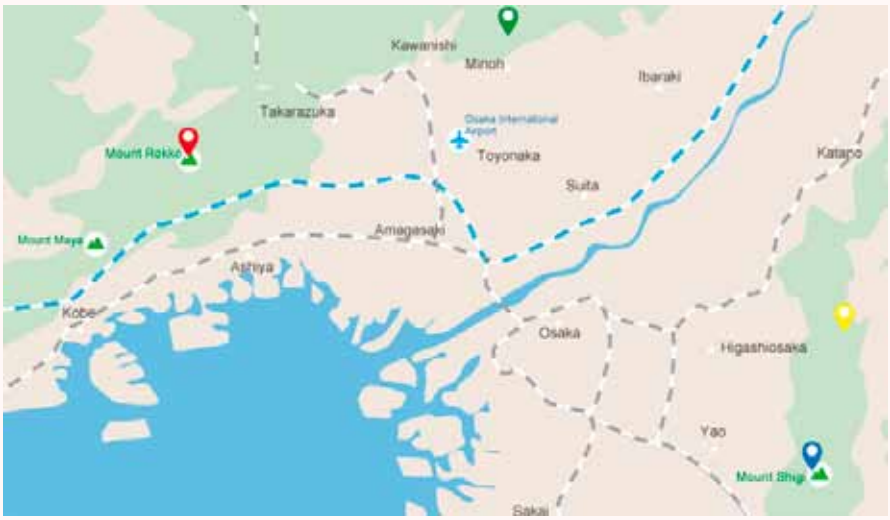
by David Priest

A view of Osaka from Mount Rokko

The sprawling megatropolis of Osaka-Kobe is flanked by abundant mountains within easy reach of the downtown areas. These varied peaks offer escape, adventure and wonder for the young and old alike, although few seem to venture beyond the hotspots of Mt. Rokko in Kobe or Minoh waterfall north of Osaka. Nevertheless, hikers and lycra-clad road cyclists dot the trails and roads that climb and snake through these beautiful areas. There are few things more serene than sitting atop one of the peaks above Katsuo-ji temple in Minoh, breathing the fresh mountain air and perhaps even spotting a sika deer in the undergrowth.

Since moving to Osaka a year and a half ago, I have visited these mountains many times, however my particular passion is descending their flanks on a mountain bike. Downhill mountain biking as it is known, is quite simple; you find an off-road trail and ride down it on a bicycle. Mountain biking is a great hobby because it gets you out of the city, deep into nature, where you can exercise your body and relax your mind, whilst also getting a rush of adrenaline! Nevertheless, to make the experience more enjoyable and potentially less injurious, the right gear is required, which at a minimum includes a good quality mountain bike, helmet, gloves and a bike bag in which to take your bike on the train. Your bagged bike will probably draw some disapproving looks on the train, however it's perfectly legal. Tell them "ookii nimotsu!" big luggage! There are many great bicycle shops around Osaka, however for

Osaka-Kobe mountain biking guide



mountain bikes, the best place to go is Ring-o-road in Toyonaka.

So you've had a busy week at work, you're a little stressed out, and your weekend is already filling up with city-oriented activities. But this weekend you've put aside a day to go mountain biking! So where should you go? There are many different courses to try, from beginner, to advanced (see the map). A good place to start would be Mt. Shigi to the south-east of Osaka. Take the kintetsu line to Shigisanguchi station and then ride the cable car right to the top of the mountain, thereby preserving your energy for the descent. At the top, prepare your bike and then turn right and ride along the small road past the graveyard. You'll find various smooth and winding tracks heading down the Osaka side of the mountain from the graveyard, which are truly a joy to ride. A little further along the track, you'll find an interesting, yet dilapidated, lookout from which to survey the area. Mt. Ikoma offers similar, smooth and snaking tracks although finding them will require a little searching and exploring. Indeed, finding new tracks is part of the pleasure of riding in a new location, however I advise against exploring during the summer months, because hiking back up with your bike from the tenth dead end service track in the sweltering heat can become very tiresome.

Mt. Rokko

Take the Rokko cable car and either descend the 'Rokko cable car track' or ask locals about the 'Terebitawa' track that descends from the television towers.

Minoh

Ride up to Katsuo-ji temple and walk your bike up the stairs towards Osaka, or catch Hankyu bus 29 from Senri-Chuo station to 'Monument Mae' bus stop. Ask local riders about 'A','B','C' courses.

Mt. Ikoma

Take the cable car from Ikoma station. Ride along the small road past the Ajisai garden and explore. This track is a little harder to find, but it heads north-west down the Osaka side of Ikoma-san.

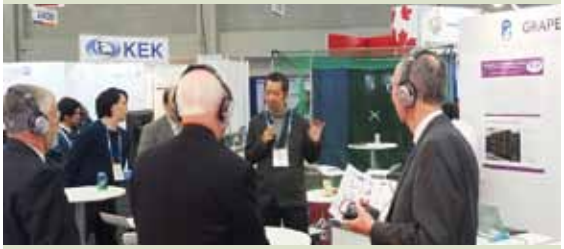
Mt. Shigi

Take the cable car from Shigisanguchi station. Descend the various tracks towards Osaka from the graveyard.

More advanced riders can take the cable car to Mt. Rokko and ride straight back down to Kobe along a steep and challenging downhill with jumps and drop offs, whilst the courses in Minoh are variable but can be quite bumpy and technical. A great source of further information (and inspiration) is YouTube, where many riders upload videos of their downhills taken with cameras mounted on their bikes or helmets. If you want to try out mountain biking but are unsure and don't want to spend the money on a bicycle, then I suggest visiting one of the bicycle stores in Minoh, where good quality bikes can be hired for the day.

David Priest is a Post-Doctoral researcher in Yuichi Taniguchi's Laboratory for Single Cell Gene Dynamics.

QBiC was there



◆ In November 2015, Makoto Taiji and members of the Laboratory for Computational Molecular Design traveled to Austin Texas for SC15 the International Conference for High Performance Computing, Networking, Storage and Analysis. The Taiji lab displayed a node board from the MDGRAPE-4 supercomputer at their booth.

◆ In December 2015, Taiji, Yasushi Okada and members of the Laboratory for Cell Polarity Regulation briefly escaped the Osaka winter to attend the international conference, Pacifichem 2015. Pacifichem is held in Honolulu Hawaii every five years and is sponsored by the Chemical Society of Japan, and chemistry societies from Asia, Oceania and North America. Around 10,000 attendees enjoyed excellent weather and small fraction of them also enjoyed an invited talk by Okada on super-resolution live imaging.

◆ Yasushi Okada also gave an invited talk on super-resolution live imaging in San Diego, California at the American Society for Cell Biology Annual Meeting, December 2015.

Katriina Lipponen visits the Masujima Lab

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"The faculty decided to purchase the equipment and now this time I am seeing how everything is connected."

"When we get set up we will want to check some standard cell lines and hopefully collaborate with Masujima when we need help." The Masujima lab will no doubt love to work with Katriina in future as in addition to bringing another smiling face to the lab she brought a box of Karl Fazer milk chocolates. "The blue box of Karl Fazer chocolates is a classic in Finland. It is the most famous chocolate in Finland and it is still the most popular chocolate in Finland"

Although she is quite busy with lab work Katriina says she plans on seeing a little bit of Japan while she is here. "I like Osaka but I don't understand any Japanese so I wonder what am I eating or what am I doing. I just buy something at the supermarket and see how it is." Asked about the winter weather in Osaka, Katriina says, "Outside is fine but inside is cold. I am not used to wearing a lot of clothes indoors. In Finland the room is more than 20 degrees Celsius. For a warm lab perhaps Katriina will visit QBiC during the summer next time. ■

Shiseido Link of Life Features QBiC Researcher

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presenting the spring or fall collections. Have you ever visited it? It's fun!

Anyway, well dressed people and beautiful presentations in a beautiful space inside of the very beautiful building located in the sophisticated area (GINZA). That was very nice break for me.

So how does this type of activity fit in with your research or your personal philosophy?

I want my work to be beautiful. Beautiful by my definition. So in this sense, I love to experience the beauty created by other people, which I believe increases the quality and beauty of my own work. Unfortunately, we had a very short time to prepare for this event and had very limited communication with Mr. Fujiwara. I would be very happy to have another chance to work with him one more time. ■

The Chow Down

Ahmed's Rice Cooker Extraordinaire!

Ingredients

2 cups rice
1/2 Dinner curry block
1/2 cup Shredded onion
1/3 cup Frozen corn
(you can add as much as you want)
(optional)1 tsp oil
Water for normal amount for the rice

Recipe

Throw all into the rice cooker and enjoy the ultimate lazy food

Have a recipe you want to share? Contact us at: **qbits@riken.jp**

NEWCOMERS at QBiC

Tomoya Maeda
Team Furusawa
Sports: Walking
Hobbies: Playing violin
Food: Sea food, lasagna

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QBiC

Published by the Office for Science Communications, RIKEN Quantitative Biology Center.
Editor: Kylius Wilkins **Design:** Yoko Sugeno
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