

## Unlocking the Mysteries of Development

Born on Sado Island, Professor Makoto Asashima grew up learning from, and being inspired by the nature surrounding him. Now he is one of the world's most honored developmental biologists, and continues to inspire the younger generation.

How do all the complex tissues and organs develop from a single cell? The immeasurable mystery of life motivated him to pursue the mechanism of egg development. Many biologists in the past had strived and failed to discover the substances inducing the creation of life, but the fact it was unresolved

only drove his enthusiasm higher—even to lead projects in space to investigate the effect of gravity on developmental physiologies.

The mesoderm induction is the first induction event occurring between the morula stage and the blastocyst stage of embryo development. The Asashima team discovered and isolated the inducing factor, activin. Activin was then found to induce cells to differentiate into various kinds of tissues depending on its concentration. Furthermore, they found that activin induces a variety of homeotic gene expressions in

undifferentiated cells. Their works have opened new windows in the field of developmental biology. This led them to successfully build several organs *in vitro*, such as pulsating hearts.

Dr. Asashima's team has also researched the interaction between signal transducers and gene expression in mesoderm induction. Recently, they have applied their results to mice and human stem cells to help reveal how our organs and body are created.

Dr. Asashima's mottoes are distinct and strong—"Be passionate



in your desires to research science, and possess a passion that transcends that passion. To reveal what is in front of you is the most important thing. If things do not go the way you expect, seek new ideas from your mistakes and value them."

## Exams are Over, Enjoy the Sunshine

Both students and team guides were still shaking off their fatigue when they boarded the bus yesterday morning. It was the day to travel to Nikko, one of Japan's famous tourist sites.

One hundred fifty kilometers inland from Tsukuba, Nikko is located amidst green, woody mountains. The bus carrying the party had to climb some steep winding roads before reaching the day's destinations: Nikko Toshogu shrine, Senjogahara, Fish and Forest Bio-Park, and Nikko Yumoto Visitor Center.

Toshogu shrine is the only spot in all the scheduled excursions where traditional Japanese architecture could be seen. This place is special for having mixed characteristics of Shinto and Buddhism—the two major components of Japanese religion. Many were taking photos of the different buildings and symbolic structures, and some questioned the guides for further details. Students were taken on a brief tour around the shrine before taking some time to

look around on their own. During this time, many climbed the 207 steps to the grave of the founding person of the Toshogu shrine, Tokugawa Ieyasu. It seemed a long and tiring way for most team guides, but many contestants quickly made their way up—curiosity seeming to win over the tiredness they must have been feeling.

The wetland called Senjogahara was another spot in this day's list of cultural and historical sites. It is described in a myth as the spot where Mt. Nantai transformed into snakes and Mt. Akagi transformed into centipedes to battle over the claim of Lake Chuzenji. Nothing could be said for sure about snakes and centipedes, but there sure were many birds and butterflies to be seen, and many students were closely observing those that came nearby.

Fish and Forest Bio-Park, and Nikko Yumoto Visitor Center were sites with biological themes. The Bio-Park was a cold water fish research center where contestants fed, or sometimes tried to catch, the



fish raised in the ponds. The Visitor Center introduced common organisms seen in the Oku-Nikko area, with hands-on models and actual samples. Although the visit was short, it probably was fun for the contestants of IBO to be in contact with anything to do with biology.

It sure was a long day, and there were many things to see. A lot of

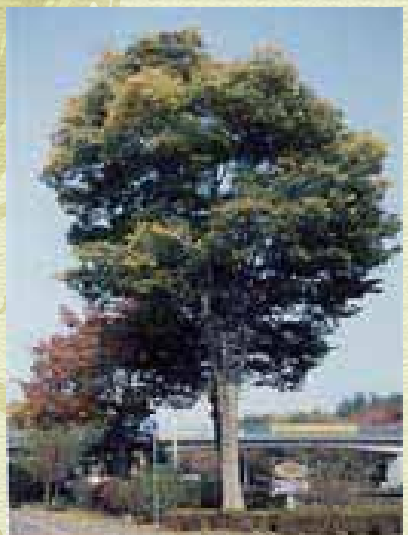
students as well as team guides seemed quite tired out from the trip. However, being after the exams, it was a more relaxed mood than the previous excursion. Hopefully, everyone was able to enjoy the day, cheer up, and feel bright and refreshed for the last day of IBO2009. After all, the meaning of the name Nikko is "sunshine."

## Ninja

Ninja were secret agents who made their reputation during the years of Japan's civil war. Ninja groups were primarily hired by feudal lords (the *Daimyo*) and strategically positioned to protect the lord and his land against raiders. However, ninja also acted as spies and scouts, sneaking into enemy territory to find out their strengths and plans. They achieved this through stealth and disguise.

Ninja fought their enemies using unorthodox weapons such as *shuriken* (star-shaped blades for throwing) or chained sickles. Ninja could also hide underwater for long periods of time, scale impossibly high walls, or seem to vanish instantly. Part of their disguise was to live as farmers. This also enabled them to grow medicinal herbs which could also be used for making gunpowder. Ninja trained to keep their bodies strong, but also worked to improve their memory. Even in sleep they were on guard, never making a sound, and with their left side down to protect the heart. In short, their whole life was training.

## LOCAL LIFE



Tsukuba

### Symbolic Tree of Tsukuba

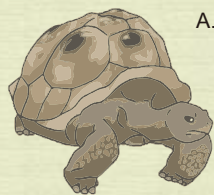
The *keyaki* tree (Japanese Zelkova) is Tsukuba City's symbolic tree. Tsukuba is well known as a science city and hosts many research laboratories. This tree was chosen as a symbol, because it is tall, powerful, and has unlimited growth potential.

*Keyaki* is a deciduous broad-leaved tree. Several magnificent *keyaki* trees in Yamanashi prefecture are designated as national natural treasures. In Japan, *keyaki* wood is sometimes used for buildings, especially shrines and temples. Some streets at the University of Tsukuba are lined with *keyaki* trees. If you have time, try taking a walk underneath these magnificent trees.

## Today's Quiz

This Galapagos giant tortoise (*Geochelone nigra porteri*) is the longest living land dwelling animal according to the Guinness Book of Records. How long did it live?

- A. 150 years B. 175 years C. 300 years



### Answer to yesterday's quiz: A

Insects need to unfold their wings efficiently when hatching from their pupa. This extraordinary mechanism has been attracting a lot of attention from engineers. Interestingly, this method is similar to a map-folding method called "Miura map folding", invented by Japanese scientist Koryo Miura, which allows easy and repeated unfolding and refolding.

## Jury Selects Medalists

The final jury conference of IBO2009 was held at the Tsukuba International Congress Center while students were at Nikko yesterday. The conference was to decide the medalists by combining the results of the practical exam and the theoretical exam. This was the most important task for the jury. To hand down an impartial judgment, a screen was installed behind the doors of the conference room, providing a much more confidential atmosphere than at previous meetings.

The meeting was positive and went smoothly. Most jury members had the impression that it was well organized. Despite the long discussions, they were not feeling tired and one

of the Pakistani jury said, "We are mentally ready to have discussions", demonstrating their commitment to IBO.

IBO2009 was, however, not only a series of meetings for them. Jury members could frequently be seen communicating with each other during breaks. They also enjoyed other events such as Tsukuba Night, where they had lots of fun enjoying a nimble Japanese dance. They also exchanged presents and generally deepened their connections with each other.

Today, the results of IBO2009 will be announced at the Closing Ceremony. So while you are congratulating the winners, also



give thanks to the jury members for their contribution.

Cloudy & partly Rainy



Weather & Clothes

## Today's Schedule

### Students Schedule

- 6:30 - 8:00 Breakfast
- 8:50 - 11:30 Excursion (Expo Center)
- 12:00 - 13:00 Lunch
- 14:00 - 15:30 Special Seminar
- 16:00 - 17:30 Closing Ceremony
- 18:30 - 21:00 Farewell Party
- 22:00 - 23:00 Dance Party

### Jury & Observers Schedule

- 7:00 - 8:00 Breakfast
- 9:20 - 12:00 Excursion (Tsukuba Science Tour)
- 12:00 - 13:00 Lunch
- 14:00 - 15:30 Special Seminar
- 16:00 - 17:30 Closing Ceremony
- 18:30 - 21:00 Farewell Party
- 22:00 - 23:00 Dance Party

High 35°C  
Low 27°C  
Humidity 88%  
Chance of rain 20%



# Three Points to Enjoy at Tsukuba Expo Center

Tsukuba Expo Center, with its towering full-scale H-II rocket, is easily found by visitors. The Center has exhibits on the development of space, marine, and nuclear technologies. Additionally, the Center operates one of the largest planetariums in the world.

Let's look at some of the most interesting exhibitions!

1. There is a lot of movie data on many deep-sea benthic feeders that were taken by the Shinkai 6500 submersible research vehicle. These intriguing marine organisms are not ordinarily seen, so these movies are popular with visitors.

2. The Biogeocenosis Simulation is a game for maintaining the balance of a biogeocenosis pyramid. You can control the size of each block with your own finger. If just one group dies out, it can mean that the whole biogeocenosis collapses and that's GAME OVER!

3. A special exhibition *Mushitech* (*mushi* (=insects) + technologies) is currently being held. Amazing technologies based on the special structure and ability of insects are on display.

A feature of this center is that visitors not only view the exhibits but can experience them first hand. There are many exhibits that demonstrate scientific mechanisms using your actual body. Thus, people of all ages can become more familiar with science while having a good time.

# Jury's Comments After the Final Conference

The sound of applause could be heard from inside the tightly restricted conference room. Shortly after that, jury members emerged with large smiles on their faces. Some of them were even skipping. The conference had been concluded and the results of IBO2009 were finally fixed.

The jury members had some advice for competitors as they wait to hear their results.

- Making good friends can be as valuable as getting a gold medal, since good communication with people from many countries is important for scientific achievement. That's because, like the dance performances at Tsukuba Night, group work is essential for scientific achievement.
- Just forget about the competition now that it is over, and start working on what you are here on Earth to do.

I hope students have been able to expand their points of view through the influence from other students, and that their experiences might help encourage basic science education in our country.

Have fun! All students did a really good job. It was a very precious experience for them just to have visited Japan and known what it is like.

So as we await the announcement of the results for IBO2009, it is important to keep in mind that while a medal at IBO is an admirable achievement, medals are not the only things to be gained. As the jury and coordinators have often emphasized, making friends here is a precious experience, and it is this that will assist competitors with their futures.



This picture was painted by Soga Shohaku (1730-1781). In this picture, two samurai (Kajiwara Kagesue and Sasaki Takatsuna) are vying with each other to reach the enemy camp first. The man who reaches first shows his courage and determination for self-sacrifice to his boss. This action symbolizes the *bushi* spirit.

Background picture:  
"Ujigawa no Senjin araso"  
by Soga Shohaku



*Neptis rivularis*



Looking at...



Handsome pair



Purifying water



A break time with origami



Nice Guy!



Feeding fish



Text books from different countries



Catch! Catch! Catch!



Hurray!!!



Hmmm.....



Delicious!!



After visiting a shrine...



How big it is!!!



Onigawara



Wow!!!



Hand purification



Legendary lion



It's over - good job everybody!



Catch me if you can▼

# Biologist Being Tourists for the Day

Released from stress and the expectations of many people, the student representatives were back to their normal teenage selves as they left on their excursion to Nikko.

The buses carrying student representatives and team guides made a rest stop on the way to Nikko. Although it was only a 15-minute break, the natural life around the rest area seemed to attract the students more than anything else. They carefully observed plants and flowers, caught a dragonfly in a plastic bag from the bus, and took pictures of a mother swallow feeding her chicks. Perhaps, this is the best way for biologists to get fresh air!

Their role as "competitors" may have finished, but they cannot quit being biologists.

Student representatives and team guides, who themselves belong to the College of Biological Sciences at the University of Tsukuba, livened up when they observed mosses with loupes, and discussed the ages of ancient trees in the precincts of Toshogu shrine. It was a pity that none of the jury members and teachers were there—they would have enjoyed joining in those conversations.

A member from Kuwait who was greatly interested in Japan, mentioned that they have something very similar to the

San-zaru (Three monkeys) in their country. Similarly, a Canadian student had learned about Japanese history at school, and mentioned the importance of actually seeing the Golden Shrine buildings.

It is a mystery where they had such energy left, but a group of students were leaping over streams in the Fish and Forest Bio-Park. A Nigerian boy who had the longest legs amongst them "accidentally" dipped his left foot in the water. In the Bio-Park, a few romances were witnessed here and there, and rays of sunshine filtering through the branches fell on them.

The beautiful landscape of the

mountains and lakes soothed the feeling of the students, who were getting fed up with the bus they had been traveling on for most of the excursion. An Australian student reached out of the windows to battle rock, paper, scissors with students in the bus parked next to them. They continued to battle even after the bus started to move, until they could not see each other.

While the team guides slept all the way back to Tsukuba, many students were tireless, chatting non-stop. In fact, the whole IBO group looked more like a school group out on a field trip.

# Orange Deliverers

We have introduced Team-G, a magnificent group of SCIBO in a previous issue of Kavaraban. Today, we briefly write about us, Team-J, which is another part of SCIBO.

The "J" of Team-J stands for journalists. The Kavaraban (Daily News of IBO2009), you are reading just now, is a compilation by Team-J. This group consists of about 20 volunteer students and three organizers.

You can easily find people in orange T-shirts around—they are members of Team-J. We attend the events of IBO2009 along with you, the participants, to make the familiar Daily News. It is a great pleasure to listen to the voices and see the

various faces of readers. A lot of encouraging voices and smiles become our motivation to work on publishing this newsletter. The members research, write and evaluate each article, and come up with the unique designs. Each member's ideas, along with your encouragement, support making the Daily News.

To deliver Kavaraban, we are working 24 hours a day, seven days a week. We want not only to deliver information of daily events' of IBO2009, but also to help preserve them as memories in your lives.



Delivering Kavaraban