



Award-Winning Research Shows that Size Does Matter

Faculty News is happy to congratulate Christos Samakovlis, Professor of Developmental Biology at the Wenner Gren Institute, on his being awarded the Göran Gustafsson Prize in Molecular Biology for 2007. The prize is awarded in recognition of his work on the development of branched tubular organs, the function of which is to distribute oxygen and nutrients in the body. These systems are found in, for example, the kidney, lungs and the vascular system.

The vascular system and the lungs consist of tubes that transport nutrients and oxygen. Tube-shaped organs play a very important role in our physiology, but many fundamental questions about their development and growth remain unanswered. How do the cells build different types of tube? What determines the branching pattern in an organ?

Christos Samakovlis has studied the relatively simple respiratory system of fruit flies in his prize-winning research. "It is my long-term goal to describe the genetic blueprint that controls the development of the tracheae, the respiratory system of the fruit fly", he says. "It has traditionally been difficult to analyse the development of internal organs, since it takes place within the embryo and cannot be seen. It is, however, possible to study these development processes in detail in living larvae of the fruit fly". The fruit fly offers, according to Christos Samakovlis, a

simple but effective genetic system for the analysis of the development of organs. The tracheae in the larvae consist of a complex network of tubes, just as do human lungs. The function of these tubes is to transport oxygen to all tissues. The embryo of the fruit fly develops to the larval stage within 24 hours and its DNA code, furthermore, is very similar to that of humans. This means that the fruit fly is a very useful model organism, and discoveries made in this system may have medical applications.

"We have constructed fruit fly lineages that carry a gene from a fluorescent jellyfish. The gene lights up the respiratory system which makes it possible to carry out a detailed and rapid analysis of genetic defects that affect the development of the tracheae", says Christos Samakovlis.

One part of Christos Samakovlis' research has attracted attention because it has shown that branching of the tracheae is controlled by a growth factor that is produced by neighbouring tissue. The research group has called the growth factor "branchless", since fly larvae that lack the gene for this factor do not develop any tracheae at all. It has subsequently been shown that the same factor controls the branching of the lung in the mouse.

"My research at the moment is focused on understanding the genetic regulation of the size of the tubes. It is quite simply the case that the size of the tubes in our organs is of major medical significance. Many serious diseases of the liver and kidneys are caused by tubes that have expanded and can no longer transport fluid in an efficient manner. And when the opposite occurs, when the tubes of blood vessels do not grow to their optimal diameter, this leads to the development of ischaemia, and neighbouring



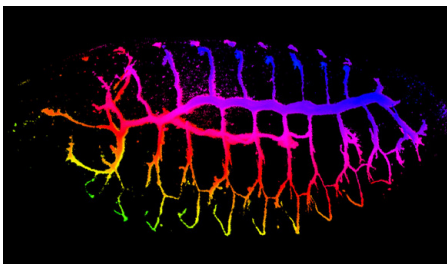
"It's a marvellous feeling to be honoured in this way", says Christos Samakovlis.

tissues suffer from a lack of oxygen and nutrients. The underlying molecular mechanisms that control the degree of growth of cellular tubes are not known at the moment, and drugs that can prevent these diseases are not available.

"We have found a number of mutations in the fruit fly that affect the size of the tracheae specifically. These mutated flies either develop ballooned cysts in the tubes, or tracheae that are too narrow. We are working with the mutated genes and analysing their role in the growth of tubes at the molecular level. It is our goal that the flies will help us understand how cellular tubes of different shapes and sizes are built. We hope that it will be possible in the long run to use the results to develop drugs that can expand or shrink tubes in human organs.

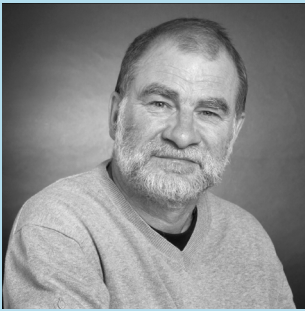
It's a marvellous feeling to be honoured in this manner and the prize money (SEK 4.5 million) is a welcome addition to our research funds", says Christos Samakovlis. He adds that he will now have a greater chance of retaining the skilled international researchers who are members of the research group.

MARLENE LINGARD



The Drosophila tracheal system

The Dean's Discourse



Springtime Musings

It will be particularly interesting this year to see how many new students apply, with our new programmes and courses on offer, and also in the light of last year's low number of applicants. Maybe we can't count on obtaining more students, since the number of students leaving upper secondary education in the natural sciences is about half of the number of places available in further education. I hope we can determine a reasonable level, so we know what to expect in future years and adapt our activities appropriately.

With respect to advanced education, and particularly with respect to the Master's programmes, we should emphasize the strength we have in the close association with our renowned research. The number of educational establishments competing for students is lower here, and we should be able to attract students, particularly students from abroad, to these programmes.

In order for us to be successful, the excellent work carried out by our information personnel must continue, possibly also intensify and find new forms. The significance of a well-functioning website cannot be emphasized enough: we will be improving our own site, both the English version and the Swedish version. It is just as important to provide input for the development of the university's central website.

I would also like to wish all of you who are applying for research grants the very best of luck. It is unfortunate that the increased funding for research provided by the new government does not imply increased resources for the research councils, only for the faculties. It may be reasonable to hope that the research proposition for 2008 will involve investment into basic research, but I am worried that this government, as the previous, will tie any new resources to ear-marked fields that are currently popular and politically correct.

Finally, I hope you will find time to enjoy the signs of nature awakening from winter sleep, providing hope that summer will arrive once again.

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Exciting Exhibition in the Wake of Discovery



Cecilia Kozma demonstrates cosmic ray tracks in the House of Science cloud chamber.

Christer Fuglesang and the crew of the Discovery visited Aula Magna on 10 April. The performance was followed by an exciting exhibition with experiments, brochures, and committed presentations in the gallery upstairs.

The exhibition in Aula Magna offered, among other attractions, a model of the space station ISS, the Amanda model, and a Nobel Prize-winning cloud chamber. The House of Science, the Swedish National Space Board and representatives from the Biology Section, the Section for Earth and Environmental Sciences, the Chemistry Section, and the Mathe-

matics-Physics Section were on hand to provide information about courses and programmes, etc.

The planned walk-about by the crew in the gallery had to be cancelled for safety reasons, and this meant that the exhibition was not as well-attended as had been hoped. The audience decided instead to go out the same way that they had come in, down on the ground floor. Despite the relatively low number of visitors, the morning was successful. The people who actually made their way up to the second floor found many things of interest up there.

ANDREAS BERGFELDT

Systems Ecologist Scientist of the Year

The Swedish Association of Scientists' annual prize has been awarded this year in honour of Carl Linnaeus. The prize for the best undergraduate project went to Jen Edgren of the Department of Systems Ecology. Jen Edgren showed that marine reserves in which commercial fishing is prohibited can benefit fish stocks, and thus in the long term also the fishing industry. There were twice as many pike in a protected area in the study region than in two other areas in which fishing was allowed.



Start-up for Better Environment and Health

On 7 May the Environmental Council at SU will fire the starting signal for a better environment and health. The challenge will be to cycle or walk to and from work, or wherever, rather than take the car or public transport. The campaign will last for three weeks, with competitions with lotteries. The competition comprises two events: cycling and walking. The department with the greatest value of kilometres per employee will win. Watch out for more information at your department!