The Systems Biology Institute Tokyo
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The University *of* Edinburgh

Press Release

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International Collaboration Focuses on Next Big Challenge in Biology

Collaboration between the University of Edinburgh's College of Science and Engineering in Scotland and the Systems Biology Institute in Japan leads the way in research in the emerging field of "systems biology".

A collaboration between pioneering research labs in Japan and Scotland will form the anchor points for an international consortium assembled to develop novel approaches to disease treatment and drug discovery. Under the terms of the "Memorandum of Understanding" signed today by Hiroaki Kitano, President of the Systems Biology Institute in Tokyo, and Igor Goryanin, Chair in Computational Systems Biology at the University of Edinburgh, Scotland, the two labs, both leaders in their respective fields, will work in partnership for an initial period of three years for the purpose of promoting collaboration to address some of the most difficult challenges in biology that may enable us to address some of the most difficult challenges now facing medical science.

The emerging field of science called "systems biology", similar to stem cell research, promises to unlock many of the secrets to the treatment and development of disease in humans and other animals.

The field has roots dating back at least fifty years, when C.H. Waddington, the eminent University of Edinburgh geneticist and embryologist, together with senior lecturer Henrik Kacser - a renowned theoretician and physical chemist - introduced ideas based on developmental biology that formed the "epigenetic landscape". This became a general metaphor to describe the dynamics of the biological developmental process. Today, the mapping of the human genome and the availability of powerful computing technology have advanced "epigenetics" into a new research model, called "systems biology". This is a revolutionary approach to analysing biological complexity and understanding how biological systems function, and continues to have significant impact on the discovery of new treatments for common diseases.

More than fifty years after its birth, the University of Edinburgh's Professor Grahame Bulfield, who lead the Roslin Institute to the cloning of Dolly the Sheep, is building a world-leading research team that includes three Chairs in Systems Biology, including newly

appointed Professor Igor Goryanin, former Head of Research of Cell Simulations Pathway Modelling at GlaxoSmithKline. Of the collaboration agreement Professor Goryanin says "Fostering links with the best research labs in the USA and Asia is part of an overall strategy to create a consortium large enough to set and embrace new standards and address some of the biggest challenges facing medicine in the next 50 years. Japan and the Systems Biology Institute are at the forefront of this research." Already the collaboration is attracting interest both commercial and academic, including support from GlaxoSmithKlein, and IBM through its "Blue Gene" supercomputer initiative, through which the consortium will have access to the world's fastest computational modelling facilities.

Japan, too, is investing heavily in systems biology, and is home to some of its strongest research teams, including the Systems Biology Institute in Tokyo, led by President Hiroaki Kitano. Kitano is also the Director of Sony Computer Science Labs and is best known to the scientific community as the originator of the RoboCup Competition and through his involvement in the development of Sony's popular AIBO robots. Of turning his attention to systems biology he says "Systems biology is asking major questions in biology to uncover the basic principles behind life, and it will become the mainstream biology in this century. Collaboration with the University of Edinburgh further strengthens our research in various areas including software standards development, as well as other biologically relevant research topics. Our institute has already carrying out joint research projects with the California Institute of Technology, the European Bioinformatics Institute in Cambridge, the University of Goteborg in Sweden, and other institutions world wide. The new agreement with Edinburgh will strengthen our global research network, and will be the beginning of a long standing relationship with Scotland". The Systems Biology Institute was established in 2000 by Dr. Kitano, as a private non-profit institution to promote research in systems biology.

The first phase of the project will focus on the creation of a "systems biology graphical notation" framework (SBGN) and continuing development of a "systems biology mark-up language" (SBML) that will allow researchers to share and exchange data and information more easily and provide them with better tools and methods for tackling cancer, diabetes, metabolic syndrome, and other complex diseases. The next three years will see the consortium addressing ever more difficult scientific challenges.

Professor Goryanin sums up the opportunities for industry: "Systems Biology is **the** big growth area in biology and medical informatics, and will be ever evolving." Professor Adrian Bird, Director of the Wellcome Trust Centre for Cell Biology, agrees. He said, "In ten years time, everyone will be a systems biologist. Systems biology will pervade everything and will be the biggest challenge between the gene and the character. It will break down all the barriers. This will become a dominant area."

For further information, please contact:

Richard Wheeler, University of Edinburgh
Richard.wheeler@ed.ac.uk

Hiroaki Kitano, Systems Biology Institute
kitano@sbi.jp