SyStemAge Newsletter No. 3

December 19, 2016

One word from the Coordinator

Anne-Claude Gavin looks back at the third year of SyStemAge

As the ability of a living organism to replace tissue decreases with age, the susceptibility to infectious diseases and certain types of cancer increases. This is associated with a weakening of the immune system, in particular hematopoietic stem cells (HSC) and potentially other cells of the stem cell niche and vascular system. SyStemAge intends to characterize the genes and pathways involved in ageing of HSC using systems biology approaches. In addition, SyStemAge aims to elucidate the role of stem cells in two age-related disorders, the myelodysplastic syndrome (MDS) and B-cell chronic lymphocytic leukemia (B-CLL) and to develop novel treatment strategies.

To achieve its goals, SyStemAge brings together a multidisciplinary consortium which is uniquely positioned to bridge the gap between clinical, biomedical and natural sciences. The consortium consists of internationally recognized experts in the fields of hematopoietic stem cell ageing and systems biology. It involves three hospital departments that are committed to implement innovative treatment strategies of leukemia and MDS, an international network of biomedical departments engaged with basic research in the processes underlying these diseases, providing a series of cellular and animal models, two well established systems biology groups, one of Europe's most experienced groups in biomedical modeling and complex systems theory and two SMEs with proven expertise in the translation of biomedical models in novel therapy strategies in humans.

Since the start of the project which kicked-off in Heidelberg in 2013 many fruitful scientific meetings, conferences and workshops took place. Overall, more than 15 publications by the partners have been written contributing to the success of the research at SyStemAge. We have also started testing novel and targeted strategies for the treatment of age-related diseases. Data analysis is ongoing and current analysis show very interesting and promising results. We are all looking forward to an exciting and scientifically prolific, but last year of SyStemAge.

The coordinator: Anne-Claude Gavin

More information: www.systemage.eu

SEVENTH FRAMEWORK PROGRAMME

EMBL

Heidelberg University Hospital

IRB BARCELONA

UNIVERSITY OF OXFORD

dkfz. GERMAN CANCER RESEARCH CENTER IN THE HELMHOLTZ ASSOCIATION

ALMAZOV Federal Heart, Blood and Endocrinology Centre

ANAXOMICS

NUS National University of Singapore

SyStemAge is a collaborative project funded by the European Commission under the 7th Framework Programme and is composed of nine academic research groups and hospital departments as well as two companies from five different EU and non-EU countries (Germany, Spain, the UK, Russia and Japan).

The project started on January 1st 2013 and will run until December 31st 2017.

Contents

Meet SyStemAge Researchers

Pavel Butylin

Since 2010 Pavel Putylin is a scientist at the Lab of Andrey Zaritskey, at the Institute of Hematology of Federal Almazov Research Centre, Sankt Petersburg, Russia. In 2009 he defended his thesis on “Condensin role in stabilizing mitotic nucleolar organizer in the yeast Saccharomyces cerevisiae”. Supervisors: Academician N.N. Nikolsky, Candidate of biological sciences A.N. Strunnikov (National Institutes of Health, USA). He is the author of numerous publications in refereed journals.

Marco Hennrich

Marco Hennrich did his PhD at the Bijvoet Center at the Utrecht University, The Netherlands, under the supervision of Prof. Dr. Albert Heck and Prof. Dr. Shabaz Mohammed. Afterwards he was employed as expert in mass spectrometry in the group of Anne-Claude Gavin at EMBL in Heidelberg. He is interested in mass spectrometry related innovative technologies to solve challenging biological questions. His current research is focusing on the analysis and data interpretation of large scale proteomics projects to understand the ageing in the hematopoietic stem cell niche.

Samira Jaeger

Samira Jaeger did her PhD at Humboldt University of Berlin and is currently a Postdoctoral Fellow at the Institute for Research in Biomedicine (IRB) in Barcelona, Spain. She is part of the Molecular modelling and bioinformatics Group at IRB and her research interests focus on the study of molecular recognition processes of biological significance from methodological and application points of view.

New Publications

REGULATION OF HEMATOPOIETIC STEM CELL INTEGRITY THROUGH P53 AND ITS RELATED FACTORS

The majority of hematopoietic stem cells (HSCs) are maintained in a quiescent state to minimize premature exhaustion induced by various stresses. However, quiescent HSCs are vulnerable to mutagenesis because of attenuated DNA repair and DNA damage response programs. Basal abundant expression of prosurvival BCL-2 proteins further endows HSCs with high resistance to apoptosis. In contrast, HSCs elicit strong activation of p53 upon DNA damage, resulting in enhanced activation of proapoptotic BCL-2 signals through p53. ASPP1, an apoptosis-stimulating protein of p53, is highly expressed in HSCs and preserves HSC pool integrity via selective induction of apoptosis.

In this paper, we discuss the role of p53 and mitochondrial apoptosis in HSC regulation and introduce the current understanding of how p53 activity is regulated to achieve a good balance between maintaining the HSC pool and preventing hematological malignancies.

The results of this fascinating study have been published online in Annals of the New Your Academy:

Yamashita M., Nitta E., Suda T.: Regulation of hematopoietic stem cell integrity through p53 and its related factors. Annals of the New York Academy of Sciences, 1370: 45-54, 2016.

Events

MOLECULAR MEDICINE PARTNERSHIP UNIT RESEARCH DAY

The MMPU hosts two annual public research days aimed at discussing the diseases studied in each research group with the wider scientific and medical communities. Invited international guest speakers working in related fields complete each research day. This November 2016 Marco Hennrich from EMBL and Patrick Horn from Heidelberg University Hospital represented SyStemAge group and talked about “Proteome of the Human Hematopoietic Stem Cell Niche”.

For more information about the MMPU Research Day, please visit the official website: https://www.embl.de/mmpu/mmpu/

To have a copy of their slides please contact the Project Manager at: systemage@embl.de

Contacts

Coordinator:	Anne-Claude Gavin (EMBL Heidelberg)
Project Manager:	Evgenia Belyaeva (EMBL Heidelberg)
Email:	systemage@embl.de
Link:	www.systemage.eu

Announcements

The following **events** are planned:

- Next WP committee meetings: December 2016
- Annual General Assembly: Spring 2017

There is the possibility to post job opportunities with SyStemAge in the newsletter as well as in www.systemage.eu. Please send an email to systemage@embl.de if you would like to place an ad.

SyStemAge
Early warning signals of ageing in human stem cells and age-related disorders