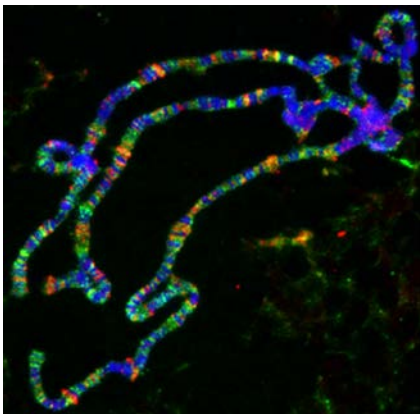


PRESS RELEASE

Holger Richly joins IMB to study stem cell differentiation and ageing

On 1st July Dr. Holger Richly joined the Institute of Molecular Biology (IMB) as the first of a second wave of new Group Leaders. His research aims at understanding how stem cells differentiate and why we grow old.

Differentiation of embryonic stem cells (ES cells) gives rise to over 200 types of specialized cell, all of which perform specific and well-defined functions within our body. For an embryo to develop properly, cellular differentiation needs to be well orchestrated with the right cells differentiating in the right places and at the right times. This is achieved through specific genes which determine the fate of cells during embryonic development. Epigenetic factors are crucial for the regulation of these genes. For instance, the modification of chromatin by various biochemical marks controls whether a gene is silenced or actively expressed. Dr. Richly and his team study the interplay between various epigenetic factors and identify new components that interpret the epigenetic landscape and drive cells into differentiation. A deeper understanding of these processes and the underlying epigenetic mechanisms will ultimately be important for the success of regenerative medicine and new cancer treatments.



Chromosome Painting

*Polytene chromosomes from *D. melanogaster* are visualized by the blue colour. Green colour indicates the epigenetic mark H2A-ubiquitin whereas red colour depicts the protein ZRF1. Yellow spots indicate the localization of ZRF1 at H2A ubiquitin marks.*

Another focus of Dr. Richly's laboratory is ageing research. Ageing is accompanied by phenotypic changes that reflect altered gene expression states within an organism. Dr. Richly's team investigates how epigenetic regulation alters gene expression patterns during the course of ageing. To conduct this research his laboratory utilizes the nematode *C. elegans*, a classical animal for ageing research in which many cellular pathways are known to impact on longevity. Using this model organism Dr. Richly's research aims to discover the epigenetic components that directly determine an animal's lifespan and to elucidate the

role of both well-known and novel epigenetic marks during ageing. These findings will deliver new insights into the molecular mechanisms of the ageing process and open new avenues for therapeutic intervention in age-related diseases.

Prior to joining IMB, Dr. Richly has investigated the epigenetic mechanisms of gene regulation at the Max Planck Institute of Biochemistry in Martinsried and more recently at the Center for Genomic Regulation (CRG) in Barcelona.

Webpage of Dr. Richly's Research Group: www.imb-mainz.de/research-at-imb/richly

Further reading:

- Richly H and Di Croce L (2011). The flip side of the coin. Role of ZRF1 and histone H2A ubiquitination in transcriptional activation. *Cell Cycle*, 10, 745-750.
- Richly H, Rocha-Viegas L, Ribeiro JD, Demajo S, Gundem G, Lopez-Bigas N, Nakagawa T, Rospert S, Ito T and Di Croce L (2010). Transcriptional activation of polycomb-repressed genes by ZRF1. *Nature*, 468, 1124-1128.
- Richly H, Lange M, Simboeck E and Di Croce L (2010). Setting and resetting of epigenetic marks in malignant transformation and development. *Bioessays*, 32, 669-679.

The **Institute of Molecular Biology gGmbH (IMB)** is a newly established research center of excellence in the city of Mainz, Germany. It is funded by the Boehringer Ingelheim Foundation which has dedicated 100 million Euros over the next 10 years to cover research at IMB—one of the largest private donations for basic research in Germany to date. The aim of IMB is to conduct cutting-edge research in developmental biology, epigenetics, DNA repair and related biomedical areas. These areas are producing exciting results that transform our understanding of how we develop, adapt to our environment, age or develop diseases, such as cancer. For further information, please visit: www.imb-mainz.de.

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