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Ralf Jungmann named Allen Distinguished Investigator

Ralf Jungmann from the Max Planck Institute for Biochemistry in Martinsried and Jan Ellenberg from the European Molecular Biology Laboratory have been named Allen Distinguished Investigators by the Paul G. Allen Frontiers Group for their pioneering research approach in epigenetics. Each of the five awards is endowed with \$1.5 million over a period of three years.

The Allen Distinguished Investigator program supports early-stage research with the potential to reinvent entire fields. One especially rapidly growing area of research is epigenetics. The question how small chemical tags on the DNA regulates gene activity is not only crucial for the understanding of cellular functions, but it is also implicated in many diseases, including cancer.

Epigenetic marks control the activity and structure of the genome. As the DNA is highly folded inside the nucleus such marks can end up in close vicinity even if they are located far away in the genome. As neighbouring epigenetic marks can influence each other, the spatial relationships are crucial for the functioning of the genome. Yet, scientists have so far been unable to gain direct spatial information on long-range genomic interactions, chromatin compaction, and positioning inside the nucleus, and therefore lack the ability to understand epigenetic regulation in the context of the highly folded 3D structure of the genome.

Ellenberg and Jungmann will take an interdisciplinary approach to develop technology which uses novel fluorescent probes to “paint” DNA sequences containing specific epigenetic marks. Barcoded labelling and imaging with DNA-PAINT, developed in Jungmann’s group, will allow them to uniquely identify over 1,000 genes in a single cell using optical super-resolution at the level of single genes. With these tools, the scientists will be able to map the complete 3D architecture of the epigenome in single human cells and analyse how the structure changes during gene activation and repression.

The Paul G. Allen Frontiers Group is dedicated to identifying and funding pioneers with ideas that will advance knowledge and make the world better. The Paul G. Allen Frontiers Group was founded in 2016 by philanthropist and visionary Paul G. Allen, and is a division of the Allen Institute, an independent medical research organization.

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About Ralf Jungmann

Ralf Jungmann studied physics at Saarland University in Saarbrücken from 2001 to 2006. After graduating from the University of California Santa Barbara, USA, he earned a doctorate from the Technical University of Munich in 2010. This was followed by a postdoctoral fellowship at the Wyss Institute for Biologically Inspired Engineering at Harvard University. Since 2014, he has been head of the independent Molecular Imaging and Bionanotechnology Research Group at the Max Planck Institute for Biochemistry in Martinsried and Ludwig Maximilian University (LMU) in Munich. He has held a professorship in experimental physics at LMU since 2016. In 2016 Jungmann was awarded the ERC Starting Grant of the European Research Council.

About the Max Planck Institute of Biochemistry

The Max Planck Institute of Biochemistry (MPIB) belongs to the Max Planck Society, an independent, non-profit research organization dedicated to top level basic research. As one of the largest Institutes of the Max Planck Society, 850 employees from 45 nations work here in the field of life sciences. In currently eight departments and about 25 research groups, the scientists contribute to the newest findings in the areas of biochemistry, cell biology, structural biology, biophysics and molecular science. The MPIB in Munich-Martinsried is part of the local life-science-campus where two Max Planck Institutes, a Helmholtz Center, the Gene-Center, several bio-medical faculties of two Munich universities and several biotech-companies are located in close proximity. (<http://biochem.mpg.de>)

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