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ERC Consolidator Grant for Ralf Jungmann

Ralf Jungmann, head of the Research Group "Molecular Imaging and Bionanotechnology" at the Max Planck Institute of Biochemistry receives ERC Consolidator Grant

Ralf Jungmann, head of the research group "Molecular Imaging and Bionanotechnology" at the Max Planck Institute of Biochemistry in Martinsried and Professor for Experimental Biophysics at the LMU Munich receives the Consolidator Grant of the European Research Council. It comes with funding of 2.3 million Euros over five years. With his team, Jungmann aims to develop novel imaging technologies to unravel how the nanoscale organization of surface proteins on immune and tumor cells dictates their decision-making processes. The techniques could yield fundamental insights into the molecular architecture of immune cell interactions and enable the future development of more refined "pattern"-based immunotherapeutics.

One of the major aims of many therapeutics is targeting cell surface proteins to alter cellular behavior. Recently approved immunotherapeutic drugs trigger anti-tumor immunity by disrupting key cell surface proteins that guide immune cell interactions.

Despite the cell surface representing a major site of drug action, its nanoscale organization remains poorly characterized. "The main reason for this is largely due to technical limitations of fluorescence imaging approaches" says Jungmann. "Current techniques do not allow high-throughput measurements of the spatial localization and interaction of hundreds of proteins with true single-protein-resolution on cell surfaces", Jungmann continues. With the ERC Consolidator Grant "ReceptorPAINT – Imaging Receptomics as a tool for biomedical discovery", his research team aims to develop novel imaging technologies based on DNA-PAINT microscopy to enable the visualization and quantification of all relevant cell surface proteins at single-protein-resolution.

To achieve this, the scientists plan to increase spatial resolution, develop DNA-based protein binders against all cell surface proteins, and devise multiplexing capabilities to resolve them with single-protein-resolution over large fields of view. The researchers will then use these new capabilities to map the nanoscale organization of hundreds of key immunomodulatory surface proteins and their corresponding ligands on key interacting pairs of immune cells relevant to current immunotherapy approaches.

"This could allow us to test the central hypothesis that surface protein architecture and patterning on immune and tumor cells dictates the outcome of their interactions", summarizes Jungmann. These fundamental insights could enable the future downstream development of next-generation personalized immunotherapeutics.

About Ralf Jungmann
Ralf Jungmann studied physics at Saarland University and the University of California in Santa Barbara and received his doctorate at the Technical University of Munich. He then worked as a post-doctoral fellow at Harvard University, USA. In 2014 he moved to Munich to head the Emmy Noether research group "Molecular Imaging and Bionanotechnology" at the MPI of Biochemistry and the Faculty of Physic of the LMU. Since 2016, Ralf Jungmann has been Professor of Experimental Physics at LMU.

About the ERC
The European Research Council, set up by the European Union in 2007, is the first European funding organization for excellent frontier research. Every year, it selects and funds the very best, creative researchers of any nationality and age, to run projects based in Europe. The ERC has three core grant schemes: Starting Grants, Consolidator Grants and Advanced Grants. The Consolidator Grant is addressed to scientists who wish to consolidate their independence by building a research team and continue a successful career in Europe.

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, about 800 employees from 45 nations work here in the field of life sciences. In currently about 35 departments and 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 in close proximity to the Max Planck Institute of Neurobiology, a Helmholtz Center, the Gene-Center, several bio-medical faculties of the Ludwig-Maximilians-Universität München and the Innovation and Founding Center Biotechnology (IZB).
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Ralf Jungmann
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