
RUDOLF JAENISCH

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CHALLENGES, OPPORTUNITIES AND CANCER

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Rudolf Jaenisch, Professor of Biology and Member of the [Whitehead Institute](#), MIT, Boston USA

Rudolf Jaenisch, a Whitehead Founding Member, focuses on understanding epigenetic regulation of gene expression (the biological mechanisms that affect how genetic information is converted into cell structures but that don't alter the genes in the process). Most recently, this work has led to major advances in our understanding of embryonic stem cells and "induced pluripotent stem" (IPS) cells, which appear identical to embryonic stem cells but can be created from adult cells without using an egg. In 2007, the Jaenisch lab was one of three labs worldwide that reported successfully taking cells from mouse tails and reprogramming them into IPS cells, by over-expressing four master gene regulators. Later that year, the lab followed up by further manipulating IPS cells to treat sickle-cell anemia in mice, the first proof in principle of therapeutic use of such cells. In 2008, the lab reported that neurons derived from IPS cells successfully integrated into fetal mouse brains and reduced symptoms in a Parkinson's disease rat model. In another experiment, researchers demonstrated that fully mature, differentiated mouse B cells can be reprogrammed to IPS cells. Researchers are now studying ways to optimize the creation of IPS cells, including finding alternatives to the potentially cancer-causing retroviruses used to transform the adult cells into IPS cells. In addition to its stem cell work, Jaenisch's lab is investigating epigenetic mechanisms for certain types of cancer and for brain development, studying how conditions such as Rett Syndrome occur. Jaenisch received his doctorate in medicine from the University of Munich in 1967. Before coming to Whitehead, he was head of the Department of Tumor Virology at the Heinrich Pette Institute at the University of Hamburg.

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