

Tobias P. Dick

PhD work at DKFZ and the University of Tübingen
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Redox regulation of cell fate

Current Research

Our research group contributes to the emerging field of oxidative signaling and redox regulation. In general, we investigate the role of oxidants and oxidoreductases in the control of cellular behaviour and cell fate.

Our main focus is the elucidation of the regulatory pathways and networks that link oxidative processes to either cellular growth or cell death. We analyze redox-based posttranslational modifications of signaling proteins and study their functional consequences.

We also study the role of oxidoreductases in the quality control of secretory proteins. We are using the major histocompatibility class I peptide receptor as a model system to study how individual thiol groups and disulfide bonds regulate key steps of assembly, retention and degradation.

More recently, we have developed genetically-encoded redox sensors which allow us to monitor intracellular redox changes in real-time. We are now using live imaging to characterize oxidative processes associated with growth factor signaling, apoptosis, senescence and differentiation.

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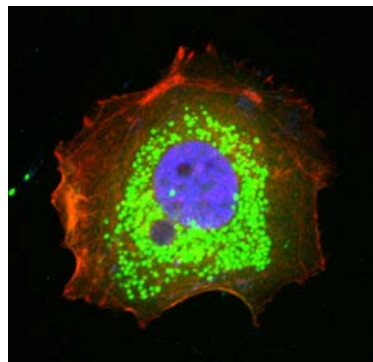
Future Projects and Goals

We will continue to study intra- and extracellular signaling pathways subject to redox control. We will make use of genetically-encoded redox biosensors to study the role of oxidants and oxidative stress in primary cells. An important goal is the creation of redox biosensor-transgenic mice.

Selected Publications

Kienast, A., Preuss, M., Winkler, M., and Dick, T. P. (2007). Redox regulation of peptide receptivity of major histocompatibility complex class I molecules by ERp57 and tapasin. *Nat Immunol* 8, 864-872.

Schwertassek, U., Balmer, Y., Gutscher, M., Weingarten, L., Preuss, M., Engelhard, J., Winkler, M., and Dick, T. P. (2007). Selective redox regulation of cytokine receptor signaling by extracellular thioredoxin-1. *EMBO J* 26, 3086-3097.



Activity-based probes visualize subcellular structures interacting with thioredoxin