Imiquimod mouse model

Imiquimod (IMQ) is a chemotherapeutic agent for many skin-associated diseases, but it has also been associated with inflammatory side effects. Clinical observations, namely an exacerbation of symptoms in psoriasis-patients using IMQ and induction of such symptoms in patients not suffering from psoriasis, have led to the concept to use IMQ as a murine model for psoriasis-like skin inflammation.

Endpoints/Outcome parameters

Traditionally the severity of the inflammation of the ear/skin is scored which is based on the clinical Psoriasis Area and Severity Index (PASI), a tool used to measure the severity and extent of psoriasis. The intensity of redness, thickness and scaling of the psoriasis is assessed. Our aim is to extent the in vivo measures for IMQ-induced skin abnormalities.
Endpoints
Our most important daily measures include:
Ear/skin thickness using a digital micrometer and luminol –based bioluminescent imaging (BLI) of myeloperoxidase (MPO) activity.
The IVIS Spectrum (Caliper Life Sciences) is used as optical imaging technology to facilitate non-invasive longitudinal monitoring of disease progression (e.g. inflammation), cell trafficking and gene expression patterns in living animals. Luminol–based BLI, a measure of MPO activity is employed as an in vivo marker of inflammation.

Outcome parameters
- Normalized ear thickness: (thickness treated ear – baseline thickness treated ear) – (thickness untreated ear – baseline thickness untreated ear)
- Back thickness
- BLI of back and ear
- PASI scores
- H&E staining: thickness stratum spinosum and basale

Histopathology and Fluorescence-Associated Cell Sorting (FACS) analysis
- FACS / immunohistochemistry (IHC) analysis of tissue and blood samples
- Analysis of profile of cytokines / chemokines / lipids in tissue and blood samples
- Hematoxylin and eosin (H&E) staining of skin tissue sections
- Several inflammatory skin diseases are associated with enhanced vascularity and vascular hyperpermeability. The vascular (hyper)permeability (Evans blue) responses are investigated.
- Multi-Epitope Ligand Cartography (MELC) allows multiple immunohistochemistry by visualizing up to 40 antibodies on the same specimen. This is done in collaboration with the Institute of Clinical Pharmacology (Pharmazentrum Frankfurt/ZAFES, Frankfurt am Main)

Relevant Publications
- Homann, J., Suo, J., Schmidt, M., de Bruin, N., Scholich, K., Geisslinger, G., & Ferreirós, N. (2015). In Vivo Availability of Pro-Resolving Lipid Mediators in Oxazolone Induced Dermal Inflammation in the Mouse. PLOS ONE, 10(11), e0143141. doi:10.1371/journal.pone.0143141

4 Effects of IMQ in Hematoxylin and eosin (H&E) stained skin sections
5 Effects of IMQ on H&E back thickness
6 Effects of IMQ on luminol-based bioluminesence BLI of mouse back