**Background /Medical Problem**
Liver steatosis and NAFLD are most common liver pathologies in the industrialized countries which can result in the non-alcoholic steatohepatitis (NASH) with an increased overall mortality. It is estimated that NAFLD increases healthcare costs by 26% and that it will be the main reason for liver transplantation in 2020. In addition there are several secondary diseases associated with NAFLD such as polycystic ovarian syndrome (PCOS), metabolic syndrome (MetS) and cardiovascular disease (CVD). Recently, our group identified the Hedgehog (Hh) signaling pathway as a regulator for liver lipid metabolism and its fundamental role in the development and progression of NAFLD, NASH and its secondary diseases. Thereby a downregulation of the cascade in hepatocytes leads to the development of liver steatosis and associated diseases. On the other hand, a slight up-regulation of the pathway is able to mitigate the liver steatosis and to influence also the behaviour of other tissues (e.g. adipose tissue, reproducing organs).

**Technology /Solution**
The studies of the Leipzig University convincingly suggest Hedgehog (Hh) signaling as a valuable target for slowing-down or even preventing progression of NAFLD and other associated problems. In particular, a slight up-regulation of Hedgehog signaling in the liver is already found sufficient to exert a strong effect thus avoiding adverse side effects. The preclinical studies identified several therapeutic targets within the pathway and point to possible drug combinations with a high therapeutic potential.

Moreover the studies resulted in the development of precise laboratory procedures. These methods are useful tools to validate whether the level of Hedgehog signaling is down- or up-regulated.

**Further reading:**
Rennert et al.: „Conditional loss of hepatocellular Hedgehog signaling in female mice leads to the persistence of hepatic steroidogenesis, androgenization and infertility” Arch Toxicol. 2017 May 30

**Benefits**
- Different targets within the Hh-signaling pathway provide flexibility for treatment options
- Novel identified targets can fuel development of new drugs

**Potential Application**
We offer tools for the monitoring of the Hh-pathway regulation in order to either develop:
- Therapeutic approaches for the prevention or regression of liver steatosis
- The treatment of NAFLD associated diseases such as lipodystrophy and polycystic ovary syndrome (PCOS)
- Screening tools for gastrointestinal / liver abnormality side effects of Hh-influencing anticancer drugs
- Cooperation in the development of novel safe Hh-influencing anticancer drugs
Therapeutic Potential of Hedgehog-Antagonists in treatment of liver diseases like NAFDL or steatosis, obesity and PCOS

Development Status

Idea
Therapeutic concepts via regulation of the Hh-pathway signaling

Demonstrator
Measuring and targeting of hedgehog signaling and lipid metabolism in the liver (Patent pending)

Therapy Development
Development of therapeutic application

Clinical phase
Clinical testing

Intellectual Property Rights

Cooperation Options
- License Agreement
- R&D Agreement
- Ownership Agreement

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