ImmunoTools *special* Award 2022

Laura Brunnthaler, PhD-student

Supervisor: Assoc. Prof. Priv. Doz. Dr. Patrick Starlinger
Co-Supervisor: Assoc. Prof. MMag. Dr. rer. nat. Alice Assinger

Institute of Physiology, Centre of Physiology and Pharmacology, Schwarzspanierstrasse 17, A-1090 Vienna, Austria

The role of circulatory mediators in liver regeneration

Liver diseases and consequently diminished liver regeneration are on the rise. A deeper understanding of the underlying processes involved in the healing and regeneration progression are necessary. Thus, circulatory mediators secreted by platelets appear of eminent importance in the regeneration process. Rapid increase in platelet count post-hepatic resection and a specific α-granule release profile indicate a central role of platelets in liver regeneration. Hence, the interaction of platelets with liver cells are of particular importance. Furthermore, not only the direct interaction of platelets with hepatocytes, but also their interaction with immune cells post hepatic resection, seems to be important.

This project aims to discover the role of circulatory mediators and immunothrombic events in liver regeneration. We focus on the role of platelets and their secreted contents in hepatic regeneration. Further, circulating leukocytes and their interaction with liver cells such as hepatocytes and liver sinusoidal endothelial cells (LSECs) will be investigated, to study underlying mechanisms involved in the healing process of the liver. As these experiments will be done with human primary cells, we would need antibodies for LSECs identification via flow cytometry. Therefore, anti-human antibody CD31 conjugated with APC and anti-human antibody CD31 conjugated with PE of ImmunoTools would help us to get a closer look into the relationship of LSECs with platelets and their secreted granule content. Further, to investigate the interaction between platelets and LSECs or hepatocytes, recombinant human cytokines rh

PDGF-AA, rh PDGF-BB would enable us to stimulate these cells and investigate subsequent effects.

Moreover, direct contact of platelets with LSECs induces secretion of VEGF and S1P from platelets, which in turn stimulates LSECs to secrete VEGF and IL-6. It also suppresses their apoptosis and induces LSEC proliferation. LSEC-secreted IL-6 promotes HGF production by hepatic stellate cells (HSCs) and thereby hepatocyte proliferation. To investigate the close interaction between LSECS and IL-6 production, we would use your recombinant human cytokine rh IL-6.

Lastly, we want to investigate the role played by γδT cells during liver regeneration. It was recently described that γδT cells could play a potential role in hepatic regeneration, via the increase of IL-17A and IL-22 levels. It was shown that TCRδ gene KO-mice are associated with delayed regeneration, which underlies this proposal. Further, Il-17A was thought to have a direct mitogenic effect on hepatocytes, Kupffer cells and neutrophils.

Our group has taken plasma samples of patients undergoing hepatic resection, 1 day before the operation, 1 day after the operation and 5 days after the operation. Therefore, various plasma analysis of these plasma samples will be done. There our focus lies in the investigation of IL17 during the process of liver regeneration and the possible opportunity to predict patient outcome preoperatively. This could facilitate better preoperative diagnosis and provide a basis for possible treatment options in patients undergoing hepatic resection. Therefore, we would need your recombinant human cytokine rh IL-17A, rh IL-17B and rh IL-17F to properly investigate the role of γδT cells and Il-17 in liver regeneration.

These ImmunoTools Reagents enable us to facilitate a deeper understanding of the underlying processes of liver regeneration and help to discover new therapeutic strategies to cope with the increase in liver diseases, diminished regeneratory potential and elevated rates of liver failures.

ImmunoTools *special* AWARD for **Laura Brunnthaler** includes 7 reagents

FITC - conjugated anti-human CD31

APC - conjugated anti-human CD31

recombinant rh IL-6, rh IL-17A, rh IL-17F, rh PDGF-AA, rh PDGF-BB

DETAILS more AWARDS