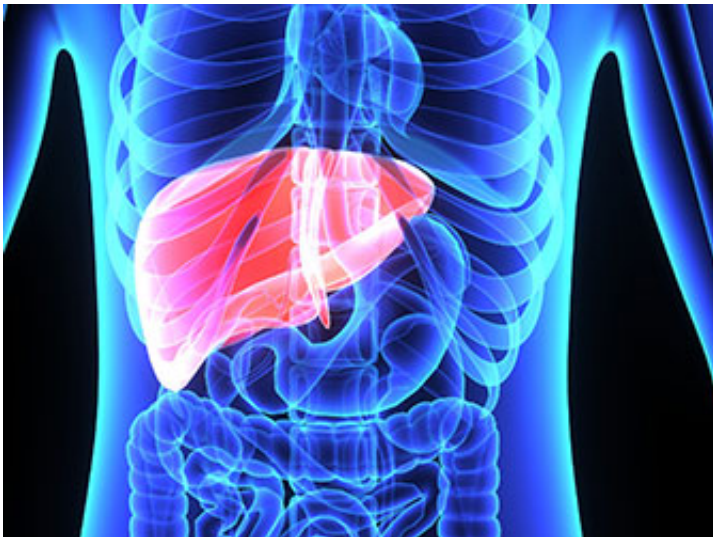


Platelets promote the liver's regeneration process following surgery

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A team of researchers at the MedUni Vienna has discovered that certain platelet-derived growth factors are of major significance for the liver's regeneration processes. It has been shown that platelets can encourage the regrowth of liver tissue in patients who have had parts of their liver removed surgically. This may also act as a starting point for the prediction of potential post-operative problems. The work has been published in the key journal on liver medicine, *Hepatology*.

Platelets are a vital part of wound healing processes. They can specifically secrete key growth factors at the site of the injury and

therefore start the damaged tissue's regeneration processes. In the latest study, which involved collaboration between the University Department of Surgery at the MedUni Vienna led by Patrick Starlinger and the Institute of Physiology led by Alice Assinger, scientists were able to demonstrate that the specific release of growth factors from the α granules was associated with post-operative [liver](#) regeneration.

The authors of this study demonstrated back in 2014 that serotonin stored in platelets can play a key role in post-operative liver regeneration. Serotonin is stored in the electron-dense granules (storage organelles) of platelets and is secreted after activation. As part of the platelet activation process, the contents of a second type of granule, known as the α granule, are also released. It has now been possible for the first time to prove a highly selective release of α granules in vivo and demonstrate the resulting pathophysiological consequences.

These granules contain both growth-promoting and growth-inhibiting factors. In vitro data from previous years have shown that platelets can be present not just, as was previously thought, in an activated or non-activated state, but instead that they are able, depending on the underlying stimulus, to release growth-promoting or growth-inhibiting factors on a highly specific basis. In the past, it was not known whether this mechanism also has a role to play in vivo and therefore has pathophysiological consequences.

The liver is the only organ that is able to regenerate itself, even after extensive damage or after parts of it have been surgically removed (resected). Up to 75 per cent of the [liver tissue](#) can be removed without the organ's metabolic functions being permanently impaired.

The liver's tremendous potential for regeneration and advancing developments in the field of liver surgery mean that even patients with impaired liver function are able to undergo intricate resections.

However, impairment of liver function still occurs in a certain percentage of patients following surgery. This liver impairment can develop into life-threatening complications and is associated with a relatively high degree of mortality. The exact causes of liver failure are so far not fully understood.

Hepatic vein blood pressure could determine selective α granule release

The scientists have now also been able to show that there is a relationship between platelet-derived [growth factors](#) and hepatic vein blood pressure. Pre-existing liver disease, which causes changes to the blood pressure in the hepatic vein, is regarded as a risk factor for post-operative complications. "We were able to demonstrate that, in patients with high hepatic vein blood pressure, the release of growth-promoting substances is suppressed and increased levels of growth-inhibiting factors are released. These findings will help us to better understand the dangerous consequences of changes in hepatic vein [blood pressure](#)," explains Starlinger. The findings obtained from the study could make a major contribution towards the development of new treatment strategies aimed at ensuring improved liver regeneration following liver resection surgery and therefore also reducing the risk of [liver failure](#) that has to date been untreatable.

More information: Patrick Starlinger et al. The Profile of Platelet α -Granule Released Molecules Affects Postoperative Liver Regeneration, *Hepatology* (2015). [DOI: 10.1002/hep.28331](https://doi.org/10.1002/hep.28331)

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