

PRESS RELEASE

(For immediate release)

World first in Zurich: Cutting-edge machine enables successful fat removal from human livers

An interdisciplinary group of surgeons, engineers, and biologists from the [Wyss Zurich Translational Center](#), University of Zurich, and ETH Zurich, has established a new strategy that allows removal of fat from fatty human livers outside the body. This outstanding result was reached by using the prototype of an automated perfusion device mimicking core bodily functions. In the past, this device was shown to be able to preserve human livers outside the body for more than a week. In the future, this extraordinary achievement may allow for the transplantation of many unsuitable livers, thereby saving the lives of patients who would not have received an organ.



Prototype of the highly automated perfusion device developed by the Liver4Life project team.

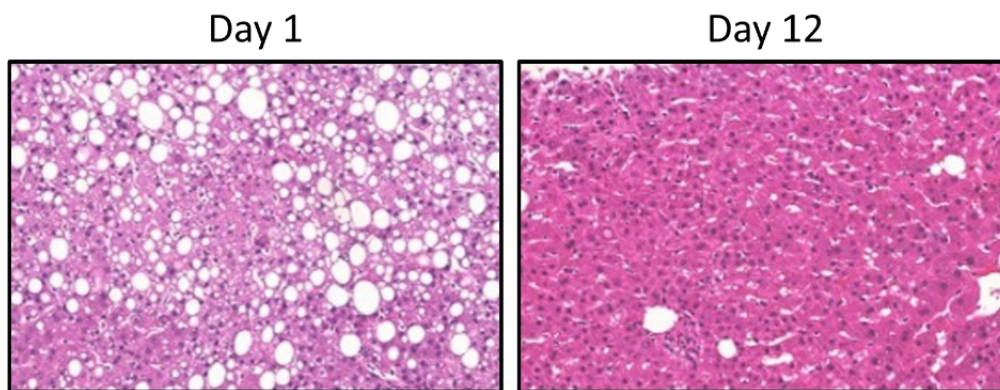
The Liver4Life project team is announcing a new breakthrough as it has been able to remove fat from livers. Fatty livers, a condition known as liver steatosis, are arising due to sedentary lifestyle and diet. Fatty livers are one of the main causes of declining liver organs for transplantation and their numbers are on the rise. Being able to remove fat from livers holds the potential to transform these otherwise unsuitable organs into acceptable donor organs.

The development of liver transplantation has been one of the most important advances in medicine in the 20th century, enabling patients with a dismal prognosis due to end-stage liver diseases or cancer to be cured and enjoy a normal re-integration in society. Despite medical improvements, the ever-increasing demand for transplants, and consequently, the mortality rate on the waiting list, continues to rise

in most countries. In this context, the ability to enlarge the donor pool can concretely give a new tomorrow to many lives.

Paving the way for the *ex-situ* (outside the body) treatment of transplants

The Liver4Life team recently induced spontaneous fat decrease by performing a sufficiently long and stable perfusion of fatty livers. These results were further improved by applying a tailored perfusion protocol over a period of up to 12 days to provide a more efficient and pronounced fat decrease.



A microscopic close-up of the changes occurring on the liver from Day 1 to Day 12. The excess fat (white circles, left image) is gradually removed over the period of 12 days.

A landmark advance that could soon be transferred to the clinic.

This landmark study demonstrates that fatty livers can be defatted under optimal normothermic (normal body temperature) perfusion between 3 to 12 days while maintaining a normal function outside the body. The observed fat decrease was markedly enhanced by the application of a special perfusion protocol. In this study, a liver with 70% fat content could be reduced to almost 0% without affecting organ function and maintaining a healthy liver tissue. This approach is groundbreaking because it could enable the recovery of fatty livers for use in human transplants and offers a prospect to patients who need a liver transplant and face a long waiting time.

About Liver4Life

The Liver4Life project was initiated at the Wyss Zurich Translational Center. This group has already pioneered long-term perfusion of livers outside the body, which can last up to nearly two weeks while the liver remains healthy and functional. In May 2021, a milestone was achieved with *the 1st worldwide liver transplantation of a damaged organ*. This liver was rejected by all centers in Europe but could be rescued on the perfusion machine. More than 2 years after receiving this organ, the patient enjoys a normal quality of life, despite his initial short term dismal prognosis.



The Liver4Life device was showcased at the Wyss Zurich Annual Event 2023. The patient (8th from left) and his wife (in the middle) met Hanjsörg Wyss (5th from left), Project Lead Dr. Waldemar Hoffmann (4th from left), Prof. Dr. Pierre Alain Clavien (9th from left), Prof. em. Philipp Rudolf von Rohr (6th from left) and Prof. Mark Tibbit (3rd from right).

About Wyss Zurich Translational Center

The Wyss Zurich Translational Center (Wyss Zurich) is a joint accelerator of the University of Zurich and ETH Zurich (Swiss Federal Institute of Technology Zurich), which was made possible by a generous donation from the Swiss entrepreneur and philanthropist Dr. h.c. mult. Hansjörg Wyss. It was established to foster translational research focused on developing treatment protocols and clinical therapies, as well as novel technologies and intelligent systems, in the emerging fields of regenerative medicine, robotics, and medical devices/bionics. Wyss Zurich unites world-leading experts from both institutions in multidisciplinary teams, pooling their knowledge and expertise. For more information, please visit www.wysszurich.ch.

Publication

Defatting of Human Livers During Long-Term ex situ Normothermic Perfusion Novel Strategy to Rescue Discarded Organs for Transplantation, Annals of Surgery 2023
(https://journals.lww.com/annalsurgery/fulltext/2023/11000/defatting_of_human_livers_during_long_term_ex_situ.6.aspx)

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