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LIVER TRANSPLANTATION

Out in the cold: new supercooling technique extends liver storage time

A new liver preservation technique that combines supercooling (subzero nonfreezing) with extracorporeal machine perfusion is able to preserve rat livers for up to 3 or 4 days before transplantation, which is three times what has been achieved with standard techniques.

The team behind this method have been developing it for several years. First, they developed a machine perfusion protocol that enabled transplantation of warm ischaemic livers. "We then tried freezing the organs and rewarming with machine perfusion, which went horribly wrong," explains Korkut Uygun, corresponding author. "We then tried supercooling, and recipients started to survive."

Thus, the protocol has three components: first, supercooling of the organ to reduce cellular metabolism; second, the machine perfusion step, which reinitializes metabolism and replenishes ATP levels; and third, the use of two preservatives, which the researchers believe help membrane stabilization and reduce the production of reactive oxygen species. Rats that received livers that had been supercooled for 3 days had excellent survival rates 3 months after transplantation, without any signs of organ failure.

The researchers are starting a study in pigs soon, with the aim of working towards a clinical trial in the near future. If this technique is successful it could have huge ramifications for global organ sharing, which in turn could help to ease the donor organ shortage. "What we would really like is to kickstart a new wave of interest on the topic of biopreservation," says Uygun. "Whether that's supercooling or suspended animation is a technical discussion, as long as we inspire researchers and funding agencies to refocus on this we'd be happy!"

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Original article Berendsen, T. A. *et al.* Supercooling enables long-term transplantation survival following 4 days of liver preservation. *Nat. Med.* doi:10.1038/nm.3588