

# Neonatal livers better source for hepatocytes than adult livers

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A research team in Spain has developed high-yield preparations of viable hepatocytes (liver cells) isolated for transplantation from cryopreserved (frozen), banked neonatal livers that ranged in age from one day to 23 days. The researchers also assessed cell quality and function and found that neonatal hepatocytes show better thawing recovery than hepatocytes isolated from adult livers.

The study appears as an early e-publication for the journal *Cell Transplantation*, and is now freely available [online](#).

"There are challenges in keeping a supply of good quality livers for hepatocyte isolation," said study co-author Dr. M.J. Gomez-Lechon of the Center for Hepatological Investigation in Valencia, Spain. "Once more, hepatocyte transplantation competes with organ transplantation. The source for hepatocyte isolation for transplantation is mainly adult livers that have been found unsuitable for organ transplantation. Accordingly, neonatal livers have emerged as an alternative source for hepatocytes because they are too small for [organ transplantation](#), yet have good quality cells."

According to Dr. Gomez-Lechon, the purpose of their current work was to explore various aspects of livers derived from [neonates](#) as alternative sources for isolating human hepatic cells. This required (1) assessing the suitability of neonatal livers that did not fill the [organ transplant](#) requirements; (2) assessing [cell viability](#), the preservation of cell membrane integrity; (3) assessing the functionality of thawed neonatal

hepatocytes and; (4) analyzing the percentage of progenitor cells in cryopreserved hepatocyte preparations.

Knowing that cryopreservation can have a detrimental impact on adult hepatocytes upon thawing, including the diminishment of cell attachment efficiency, their research suggests that neonatal hepatocytes can be cryopreserved with "no significant loss of viability after thawing", an important factor for [cell transplantation](#).

"Our results not only indicate that neonatal hepatocytes can be cryopreserved without significant loss of viability, but also after thawing they show smaller apoptotic and necrotic cell numbers when compared to adult hepatocytes," explained Dr. Gomez-Lechon.

Another benefit of hepatocytes derived from neonatal livers, said the researchers, is that their greater viability provided greater cell attachment efficiency and expression of adhesion molecules. They also suggested that there are good indications of hepatocyte mitochondria preservation.

"The larger number of [progenitor cells](#) in thawed hepatocyte suspensions suggests that they may have an advantage for being engrafted into the host [liver](#) and better long-term survival," they wrote. "Thus, the characteristics of thawed neonatal hepatic cells may confer important advantages for transplantation when compared to adult cells."

"This study demonstrates an alternative source for hepatocytes that could favorably impact the transplantation of [liver cells](#), though numerous other factors need to be considered. Unfortunately, in most studies, stem, fetal or immature hepatocytes, do not engraft or proliferate well post transplantation. If the neonatal hepatocytes are mature enough to engraft efficiently, they may be useful for transplant. Studies of engraftment and proliferation will be needed to fully evaluate the value

of these cells for patient transplants" said Dr. Stephen Strom of the Karolinska Institute, Sweden and section editor for Cell Transplantation.

**More information:** Tolosa, L.; Pareja-Ibars, E.; Donato, M. T.; Cortes, M.; Lopez, S.; Jimenez, N.; Mir, J.; Castell, J. V.; Gomez-Lechon, M. J. Neonatal livers: a source for the isolation of good-performing hepatocytes for cell transplantation. Cell Transplant. Appeared or available online: June 25, 2013

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