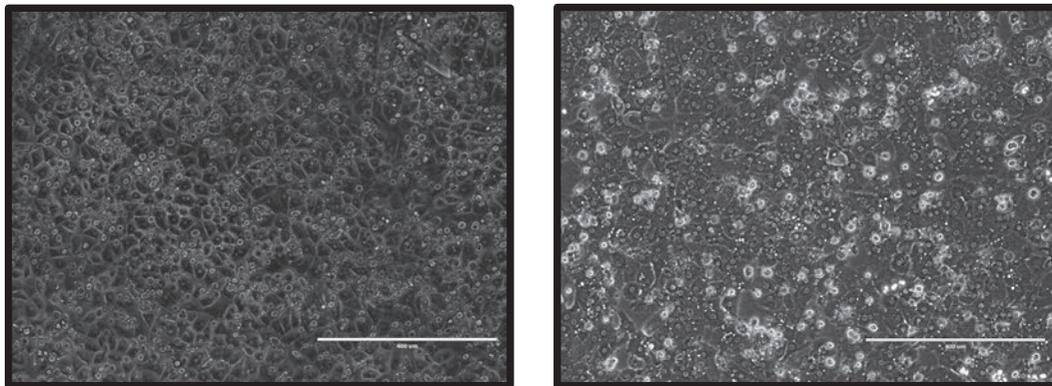


PRESS RELEASE

Exploring donor demographics effects on hepatocyte yield and viability: Results of whole human liver isolation from one center

May 2019 – Exploration of donor demographics and procurement data demonstrate that livers with typical exclusion factors for transplantation can still produce viable hepatocytes in large quantities, necessary for the development of novel therapeutics and bioengineering for clinical research applications.



Left: Fresh human hepatocytes in culture showing capability of attachment and maintaining viability after isolation. Right: Contrast image of human hepatocytes on day 3 of culture.

Many researchers and scientists are exploring different avenues in order to address the shortage of livers for transplantation and are developing techniques to lessen the burden on orthotopic liver transplantation, which is currently the only treatment for end stage liver disease. Techniques such as recellularized bioengineered livers and hepatic cell transplantation are exciting but still remain limited on a clinical level. In addition, new pharmaceutical therapies rely on primary hepatocytes to determine the toxicity, metabolism, and drug-drug interactions necessary for FDA approval. A large source of human hepatocytes is thereby beneficial for continuing this research as well as potentially developing new lines of therapy both clinically and pharmaceutically. The question remains, where do large sources of primary hepatocytes come from?

A group of scientists at the Center for Engineering of Medicine at Massachusetts General Hospital in Boston, Massachusetts explored the donor demographics and procurement data of 16 livers to determine if these factors impact the yield and viability of primary hepatocytes. The project, led by Sharon Geerts, looked at 6 different donor demographics and 4 different procurement factors. The donor demographics consisted of age, body mass index (BMI), race, cause of death, whether the donor was considered death by cardiac death or death by brain death, and gender. The procurement factors that were considered were warm ischemia time, oxygen saturation, mean arterial pressure, and cold ischemia time.

Donor demographics such as race and gender had significant impacts on viability and yield while demographics such as BMI, age, donor status, cause of death did not. In addition, liver procurement data such as warm ischemia time showed that organs with less than 30 mins WIT led to significantly reduced yield, but no impact was found on viability. Cold ischemia time had no impact on yield, but longer cold ischemia time did decrease the viability of hepatocytes.

Though the number of livers was small ($n = 16$) and should be taken into consideration, the conclusions drawn could be used as indications to expand liver selection criteria for hepatocyte isolations for many researchers and incorporate livers from donors that would have otherwise been discarded. In addition, this research demonstrates using livers from organ procurement centers that work on a nationwide level, with various procurement protocols and long transit times can still produce high quality hepatocytes.

Additional co-authors of the Technology paper are: Sinan Ozer, Christopher Chu, Bryan Fuchs, MD., Kenneth Tanabe, MD., Heidi Yeh, MD, and Korkut Uygun, PhD. Dr. Yeh is from the Division of Transplantation under the Department of Surgery at Massachusetts General Hospital and Harvard Medical School in Boston, MA. Drs. Fuchs and Tanabe are from the Division of Surgical Oncology at the Massachusetts General Hospital Cancer Center and Harvard Medical School, Boston, MA.

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