

Regenerative Hepatology Consortium

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Q. Why is a bioengineered liver deemed necessary and what barriers have yet to be overcome?

There are many clinical situations where the patient presents with a failure of the liver to provide functions which are indispensable for life. These conditions typically include a sudden and dramatic loss of liver function in a subject previously healthy (acute liver failure) or an acute aggravation of a previously chronic condition affecting the liver (acute on chronic liver failure). In the majority of these cases, liver transplantation is necessary to save the life of the patient. In addition, other clinical conditions, more typical of the paediatric population, are characterised by the failure of the liver to perform a single specific but indispensable function. Also in this case, liver transplantation represents, for the moment, the only definitive solution. It is now evident that the number of donor livers necessary to match request is insufficient and the introduction of bio-engineered liver tissue would provide major aid in the management of some clinical situations.

The technologies necessary for the creation of a bioengineered liver are rapidly advancing and the key delivery work packages have been identified. The main barrier is still represented by the choice of cell types reproducing the phenotype of normal human liver and the appropriate repopulation strategy of the liver scaffold.

Q. We understand the process of developing a bioengineered liver will take long: Is there any intermediate evolutionary step at hand?

Yes, there is. The first approach is the creation of a bioengineered bile duct by repopulating a natural ECM scaffold obtained from a discarded bile duct with the appropriate cell types. The second is the development of a 5% bio-engineered liver mass in order to develop "implantable liver tissue" for the treatment of inherited hepatic metabolic disorders mostly affecting paediatric patients.

Q. Meanwhile, what could the medical community propose in order to address the issue of insufficient organ donations?

This is a very important question. Nowadays, we are facing declining numbers of cadaveric donors in all European countries with a direct impact on the quantity and quality of available organs. Through the implementation of advanced life support technologies, we are now starting to be able to preserve the organs outside the body or still inside the liver of donors in cardiac arrest, increasing the number of organs available. This is actually helping to maintain the number of transplants performed every year. But if the trend persists, we will need new strategies to address this issue. Increasing living donation is one of them, as well as raising the awareness among the population at large to become organ donors following brain or cardiac death. Finally, we also need to increase the awareness of government and medical authorities to these issues, putting pressure on them to increase funding in science and research to solve these pressing problems.

Q. How are EASL and its Foundation reacting to fulfil such an unmet clinical need as organ shortage?

EASL and its Foundation are greatly and continuously supporting the EASL Consortium for Regenerative Hepatology through the inception of the Albert Geerts' Fellowship, that funds a postdoctoral fellow for 1 year to work in these challenges of liver bioengineering and regeneration. We believe that through research support to investigate new ways of developing bioengineered liver tissue/organs for transplantation, and by raising the awareness of these huge challenges and unmet clinical needs, we will be able to offer a solution to all these patients one day.