CREATION OF ARTIFICIAL LIVER: TECHNOLOGIES, DIRECTIONS. REVIEW

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Introduction. The artificial liver support system (ALSS) is a therapeutic approach and an important direction in biomedical research, involving the use of an external device to replace or support liver functions in patients with acute or chronic liver failure who require liver transplantation. This study aims to review and synthesize current technologies and research directions in the development of artificial liver systems that sustain the lives of patients with acute and chronic liver failure.
Material and methods. A review of 32 bibliographic sources from the specialized literature published over the past 10 years was conducted using the databases Google Scholar, PubMed, National Institutes of Health (NIH), BioMed Central (BMC), SpringerLink, and ScienceDirect, focusing on technologies and research directions in artificial liver systems.
Results. There are three main categories of ALSS: 1.) non-biological artificial liver (NBAL) – hemoperfusion, plasmapheresis, MARS, Prometheus, SPAD, SEPET, that operate on the principles of dialysis and adsorption. 2.) bioartificial liver (BAL) - ELAD, HepaCure-BAL, AMC-BAL, that integrate hepatocytes (porcine, human, tumor HepG2 and its derivative C3A, immortalized, stem cells: embryonic (ESCs), induced pluripotent (iPSCs), human mesenchymal (MSCs)) in bioreactors to reproduce the liver's biosynthesis and detoxification functions. 3.) hybrid artificial liver (HAL) - HepatAssist, MELS, Li-HAL, that combines efficient detoxification of NBAL with metabolic functions of BAL.
Conclusions. Artificial liver support systems improve survival rates among patients with acute or chronic liver failure awaiting liver transplantation and, in individuals with preserved hepatic regenerative capacity, promote full functional recovery.
Keywords: artificial liver, liver failure, NBAL, BAL, HAL.