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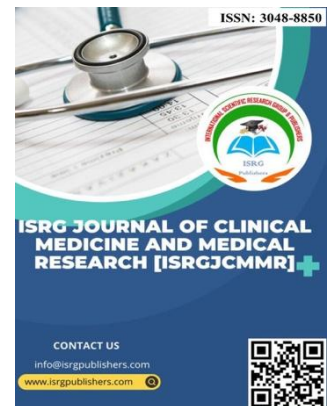
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Mr. Liver Implantation Method: An Innovative Conceptual Idea for the Proposed Liver Regenerative Strategy

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Abstract

Chronic viral hepatitis remains a major public health challenge and continues to contribute substantially to liver cirrhosis and hepatocellular carcinoma, particularly in Asia and in high-burden regions such as Hong Kong. Hepatitis A, B, C, and E differ in transmission route, clinical course, and long-term consequences, but hepatitis B and hepatitis C are especially important because of their association with chronic infection, progressive liver injury, cirrhosis, and malignant transformation. Over recent decades, vaccination, antiviral therapy, and biologic advances have improved prevention and disease control, yet hepatocellular carcinoma remains difficult to cure, and the prognosis of advanced disease is still poor [1][2]. This research paper reviews the epidemiology of hepatitis-related liver disease, the historical development of preventive and therapeutic measures, and current limitations in the treatment of liver cancer. It then proposes a speculative regenerative strategy termed the “Mr. Liver Implantation Method,” which is intended as a stem cell-based approach to hepatic repair and tissue replacement. The innovative concept is based on harvesting a small quantity of healthy liver tissue, expanding the cells under controlled culture conditions, and implanting the regenerated tissue into the patient to restore hepatic structure and function. This paper also introduces the idea of a bridging culture model using animal-derived organs, especially porcine liver, as a potential scaffold or intermediate platform for tissue expansion. Although the proposed approach is highly theoretical, it is framed within the broader context of regenerative medicine, tissue engineering, and organ restoration. The discussion emphasizes the liver’s intrinsic regenerative capacity and the potential of patient-derived cells to reduce immunologic incompatibility.

Keywords: Hepatitis B, hepatitis C, hepatocellular carcinoma, liver regeneration, stem cell therapy, tissue engineering, biologic agents, gamma globulin, innovative porcine bridging concept, regenerate liver technology concept, Mr. Liver Implantation Techni.

Introduction:

Liver cancer is one of the leading causes of cancer-related death in Hong Kong and remains a major global health concern. In many cases, hepatocellular carcinoma develops on a background of chronic liver disease, most commonly chronic viral hepatitis, cirrhosis, or both. The burden of liver disease is influenced by multiple factors, including viral infection, dietary exposures, alcohol use, metabolic dysfunction, environmental risk factors, and broader public health conditions. In endemic regions, chronic hepatitis B infection has historically played a central role in the development of cirrhosis and liver cancer.

Viral hepatitis refers to a group of infectious diseases caused by hepatotropic viruses, most commonly hepatitis A virus, hepatitis B virus, hepatitis C virus, and hepatitis E virus. These infections differ in their transmission pathways and clinical implications. Hepatitis A is usually transmitted through the fecal-oral route, often via contaminated food (uncooked) or water. Hepatitis B is primarily transmitted through blood and body fluids, including sexual contact, perinatal exposure, and unsafe injection practices. Hepatitis C is mainly transmitted through blood exposure, such as needle sharing or contaminated medical equipment. Hepatitis E is also generally acquired through rats, fecal-oral transmission and is frequently associated with contaminated food or water supplies.

Among these infections, hepatitis B and hepatitis C are of particular concern because they may progress to chronic liver inflammation, fibrosis, cirrhosis, and eventually hepatocellular carcinoma. A patient infected with hepatitis B may remain asymptomatic for a prolonged period, while ongoing viral replication and persistent immune-mediated liver injury can silently worsen hepatic damage. Without effective monitoring and treatment, chronic infection may progress over time to advanced liver disease and malignant transformation. The close relationship between viral hepatitis and liver cancer explains why prevention, early diagnosis, and long-term treatment remain essential components of hepatology and oncology practice.

Hepatitis and liver cancer

The relationship between chronic hepatitis and liver cancer is well established in clinical medicine. Persistent infection causes repeated hepatocyte injury and regeneration, creating a biological environment that favors genetic instability, fibrosis, and carcinogenesis. Over time, chronic inflammation and cirrhosis may alter the liver microenvironment, increase oxidative stress, and disrupt normal cellular repair mechanisms. These processes together produce to the development of hepatocellular carcinoma. Therefore, viral hepatitis is not merely an isolated infectious disease but a major upstream determinant of liver malignancy.

In earlier decades, hepatitis infections were more widespread because of limited public health awareness, inadequate vaccination coverage, and less effective infection control practices. During the 1960s and subsequent years, hepatitis represented a major infectious disease burden in many parts of Asia. The prevalence of hepatitis B was especially high in mainland China and surrounding regions. In Hong Kong and other Asian settings, epidemiologic studies have attempted to explain the persistent burden of chronic hepatitis through social, environmental, and host-related factors. These studies have contributed to a stronger understanding of disease patterns and risk distribution in the local population.

Although some research links susceptibility to liver structural composition, a more medically cautious interpretation is that disease prevalence reflects a combination of host factors, transmission patterns, public health infrastructure, and population-level exposure risks. In modern hepatology, such differences are usually understood through the interaction of viral epidemiology, immunologic response, genetic susceptibility, lifestyle, and socioeconomic conditions. This broader perspective is more consistent with current scientific reasoning and provides a stronger basis for discussion [1-3].

Prevention and treatment

Over the past several decades, prevention and treatment of viral hepatitis have improved substantially. Universal or targeted vaccination programs, especially for hepatitis A and hepatitis B, have reduced the incidence of new infections in many populations. Public education, screening, blood safety measures, sterile injection practices, and sexual health awareness have also played important roles in reducing transmission. These measures have not eliminated hepatitis entirely, but they have significantly lowered the burden of disease in many regions.

Therapeutic advances have also transformed the management of chronic viral hepatitis. Antiviral treatment can suppress viral replication, reduce hepatic inflammation, slow fibrosis progression, and lower the risk of liver cancer. In the case of hepatitis B, long-term antiviral therapy has become a cornerstone of disease management. In hepatitis C, modern direct-acting antiviral drugs can achieve sustained virologic response in most patients, effectively curing the infection in many cases. These developments represent one of the major success stories of contemporary medicine.

Despite these advances, a substantial proportion of patients with chronic liver disease continue to progress to cirrhosis and liver cancer. In such cases, treatment becomes more complex, because the disease is no longer limited to viral replication but includes structural liver damage, portal hypertension, hepatic dysfunction, and neoplastic transformation. This is why liver cancer remains one of the most difficult malignancies to treat successfully, particularly when diagnosed at an advanced stage.

Clinical Surroundings in Hong Kong

Hong Kong continues to face a significant burden of chronic hepatitis and liver cancer. Historically, hepatitis B has been especially relevant in this region, and many patients with chronic infection are now aging into the period of life when complications such as cirrhosis and hepatocellular carcinoma become more common. In this context, long-term surveillance, early detection, and specialized hepatology care are critically important. Local academic institutions have contributed to research on liver disease, including the study of tissue characteristics, disease progression, and patient outcomes. The development of tissue databases and the collection of patient samples have supported clinical and translational research in hepatology. Such work has improved understanding of liver disease in the local population and has helped clinicians tailor their approach to diagnosis, monitoring, and treatment. Professor Lai Ching-lung [1] is recognized as an important authority in hepatology and has made influential contributions to the field, particularly in relation to hepatitis B and chronic liver disease. His research has helped shape understanding of viral hepatitis in Hong Kong and the wider Asian context [2][3].

Innovative Concept Idea:

Innovative Concept in Regenerative Liver Rationale

Our core proposal in this research paper is a hypothetical regenerative therapy intended to address the limitations of conventional treatment for liver cancer and advanced hepatic injury. The liver is uniquely important among solid organs because it has a remarkable capacity for regeneration. Following partial injury or partial hepatectomy, the liver can restore much of its mass and function through coordinated hepatocyte proliferation and tissue remodeling. This biologic property makes the liver an attractive target for regenerative potential.

Stem cell research and tissue engineering is our strategies, such as for organ repair and replacement. These approaches aim to regenerate functional tissue in the laboratory or through biological scaffolds, then transplant that tissue into the body. In principle, such methods may support the restoration of damaged liver tissue or even provide partial organ replacement.

So, this research innovatively proposes harvesting a small portion of healthy liver tissue from the patient, culturing the cells, and re-implanting the regenerated tissue. A more technological expression of this idea would be patient-derived autologous cell expansion followed by tissue implantation. Using the patient's own cells would, in theory, reduce the risk of immune rejection and improve compatibility. This strategy requires robust control of cell differentiation, tissue architecture, vascularization, and oncologic safety.

Innovative Mr. Liver Implantation Concept

Our proposed "Mr. Liver Implantation Method" can be described as a three-stage experimental framework consisting of tissue sampling, *ex vivo* cultivation, and implantation. First, a small sample of healthy liver tissue would be obtained from the patient or another suitable source. Second, the cells would be expanded and differentiated under controlled laboratory conditions to generate functional hepatic tissue. Third, the regenerated tissue would be transplanted into the patient to replace or support damaged liver segments.

In principle, our innovative approach aims to restore liver structure and function rather than merely suppress disease progression. This is an important conceptual distinction, because current therapies for advanced liver cancer often focus on controlling tumor growth, prolonging survival, or alleviating symptoms, rather than restoring normal hepatic architecture.

Our liver regenerative strategy would therefore represent a fundamentally different goal. Our liver regenerative proposal should be regarded as exploration potential rather than treatment.

Innovative Bridging Culture Concept

Building on our innovative concept, this research paper introduces a bridging culture concept that uses animal organs, especially pig liver, as an intermediate platform for tissue development. In a more advanced medical context, this idea may be described as cross-species scaffold-assisted culture or xenogeneic bridging support for tissue engineering. The underlying goal is to provide a biologic environment that supports cellular growth and maturation while attempting to minimize immune incompatibility.

Pigs are commonly studied in translational medicine because of their physiologic and anatomic similarity to humans in certain

contexts. Porcine organs and tissues have long been considered in xenotransplantation research, organ scaffolding studies, and regenerative medicine experiments.

This research suggests that such bridging culture may be more feasible than direct laboratory culture. While biologic scaffolds and organ support systems may offer advantages over simple cell culture, they also introduce additional complexity. We frame this hypothetical concept idea, named "MR Liver Bridge Regeneration." A more specific wording would state that porcine-derived platforms might, in theory, provide a biologically favorable environment for tissue engineering. It may serve as a new hope for the patient.

Scientific Limitations

It is important to emphasize that the proposed method remains highly hypothetical. The liver's regenerative ability does not automatically mean that full hepatic replacement can be achieved through simple cell culture and implantation. The liver is a highly vascular organ with multiple specialized functions, including detoxification, protein synthesis, bile production, glycogen metabolism, hormone processing, and immune regulation. Successful tissue replacement would require not only hepatocyte generation but also the creation of supporting biliary, vascular, and stromal structures.

In addition, liver cancer poses an added oncologic challenge because regenerative interventions must not stimulate tumor growth or provide a niche for residual malignant cells. Any regenerative strategy in oncology must be assessed for tumor safety, recurrence risk, and long-term stability. This is especially important when the tissue environment has already been altered by chronic inflammation, fibrosis, or previous treatment. Therefore, the concept of regeneration cannot be separated from the need for cancer control and careful patient selection.

Clinical transition would also require staged development. A valid pathway would begin with laboratory proof-of-concept studies, followed by animal experiments, then safety testing, and only later carefully controlled human studies if the evidence justified it. Premature clinical use would be inappropriate and unsafe. Therefore, although the proposal is meaningful, it should be presented as an early-stage hypothesis rather than as an immediate treatment recommendation.

Conclusion

Chronic viral hepatitis remains a major cause of cirrhosis and hepatocellular carcinoma, and liver cancer continues to pose a serious clinical challenge in Hong Kong and other high-burden regions. Vaccination, antiviral therapy, and public health interventions have significantly improved prevention and disease control, but they have not eliminated the problem. Patients with advanced liver disease still face limited curative options, especially once malignancy has developed. The innovative "Mr. Liver Implantation Method" proposed in this research paper is best understood as a theoretical regenerative concept based on derived cell culture and tissue implantation. Its appeal rely on the possibility of restoring liver function rather than simply controlling disease. Our innovative additional idea of a porcine bridging culture concept may have significant potential in liver regeneration. At present, our innovative ideas should be regarded as experimental hypotheses rather than clinically established therapies. Our discussion innovative concept highlights an

important direction for future medical research: the integration of hepatology, regenerative medicine, stem cell biology, tissue engineering, and translational oncology. This research suggests that if our innovative concept continues to advance, it may eventually become possible to develop more effective method in restorative treatments for liver. Hope our research can contribute to patients and humanity.

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References:

1. Lai, C.-L., Chien, R.-N., Leung, N. W. Y., Chang, T. T., Guan, R., Tai, D. I., Ng, K. Y., Wu, P. C., Dent, J., Roman, S., & Gray, D. F. (1998). A one-year trial of lamivudine for chronic hepatitis B. *New England Journal of Medicine*, 339(2), 61–68. Lai, C.-L., Chien, R.-N., Leung, N. W. Y., Chang, T. T., Guan, R., Tai, D. I., Ng, K. Y., Wu, P. C., Dent, J., Roman, S., & Gray, D. F. (1998). A one-year trial of lamivudine for chronic hepatitis B. *New England Journal of Medicine*, 339(2), 61–68.
2. Kaewdech, A., et al. Asian perspective on hepatitis B virus and hepatitis C virus. *Clinical Liver Disease*, 2024.
3. Parry, J. One third of hepatitis B carriers in Hong Kong have severe liver disease. *BMJ*, 2008.