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Commentary Article

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Innovative Antiviral Drugs must be Capable of Dealing with Both Old and New Viruses

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DESCRIPTION

As the first HIV treatment, iazidothymidine prompted many scientists and pharmaceutical companies to develop antiviral drugs. With the exception of the co-receptor antagonist maraviroc, approximately 25 HIV medicines targeting viral proteins have been approved until 1987. HIV-infected individuals have a greater risk of death and must take their medication for the rest of their lives. The current goal is to develop an HIV cure by utilising various methods to eventually eradicate latent HIV from its hiding places. Gene suppressing and genome coding techniques off-target and immunogenic effects can be avoided, and effective delivery can be achieved, as siRNA-mediated gene silencing advances from study to medical technology. The siRNA therapy is already in clinical trials due to encouraging outcomes from clinical studies in the oncology domain for a few viral infections.

The discovery of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) may not only change how molecular biology is conducted in science labs, but it may also lead the way for the creation of some ground-breaking treatments for HIV and other chronic diseases brought on by viruses like hepatitis B, hepatitis C, or Epstein-Barr. Clinical CRISPR application regulatory challenges are being actively resolved. There are still several difficulties with viruses specifically, including choosing the best viral target, effectively disseminating through viral or non-viral vectors, and developing resistance. Studies are underway on how to treat HBV. This virus regularly infects more than 240 million individuals. HBV is still the leading cause of hepatocellular carcinoma, the third most lethal cancer in the world, and fifty years after its discovery. Anti-HBV nucleotide medicines achieve viral suppression and remission of liver disease in the majority of treated individuals, lowering (but not eliminating) the incidence of hepatocellular cancer.

Unfortunately, these antivirals are incapable of removing HBV Covalently Closed Circular (ccc) DNA from infected cells, necessitating lifelong treatment to prevent virus recurrence. As a result, the study hopes to find a cure for HBV by either lowering and removing the intrahepatic pool of cccDNA or suppressing its transcriptional activity. Direct antivirals and immunotherapeutic methods are two approaches being explored. The first class includes HBV entry blockers, medications that destroy or mutate the cccDNA, siRNA or antisense oligonucleotides to target viral transcripts, nucleocapsid assembly modulators, and techniques to reduce HBsAg release in blood. Impact receptor 7 agonists are among the most exhaustively studied drugs in clinical trials for HBV immunotherapy. The absence of T-cell response in chronic HBV is aided by the expression of co-inhibitory receptors and immunosuppressive cytokines. Novel anticancer approaches based on check-point inhibitors to re-establish antitumor immunity have yielded promising results for HBV in animal models and *ex-vivo* human study. Although novel vaccine formulations are being tested in clinical trials, the results of therapeutic vaccinations have been unfortunate.

It is expected that in order to fully treat HBV, a combination of immunomodulatory techniques to re-establish the antiviral immune response and pharmaceutical antiviral drugs that block various stages of the HBV lifecycle would be required. Herpes, HIV, hepatitis B or C, influenza, and other viral diseases can now be treated with antiviral drugs. Even so, there are still a handful of viruses that are relevant from a medical standpoint that have no effective cure. In addition to deadly infections (like Ebola, yellow fever, or the Zika virus), this study includes common or potentially pandemic viruses. If a vaccine is unavailable or is used incorrectly, these infections could reappear at any time.