HEPA44

Overview

Hepatitis B is a major global disease and is called “the national disease” in China for its high incidence rate. Existing drugs can only play an effective role in inhibiting the virus, but virus replication may be active again after drug withdrawal and the disease will relapse, so antiviral treatment needs to be used for a long time. However, supporting long-term treatment requires a lot of money, at present, these antiviral drugs are expensive, and long-term use will put a huge economic burden on patients. Therefore, it is the future direction to actively develop better, inexpensive, and high-quality drugs. In view of the inefficiency of previous treatment with preventive vaccines or natural antigens, we propose a new strategy for “Mimogen therapy”. That is, instead of using natural antigens, antigens are designed from scratch on the basis of epitopes to eliminate pathogenic epitopes and enhance protective epitopes so as to achieve “improvement on nature”. In order to develop vaccine based on simulated antigens, the epitope-based vaccine design (EBVD) technology route was established, and HEPA44 was designed and screened. As a first in class new biological product, HEPA44 was developed and patented in China, the United States, and India.

The HEPA44 is a polypeptide immunogen that was designed and screened by the epitope-based vaccine design method, by which epitopes of various (immune response) types, from various antigens, with various connection sequences, by various chemical modification groups etc., were designed and optimized based on the epitope map of HBV antigen. HEPA44 is a water-insoluble polypeptide, which is partially consisted of an artificially designed linear 44 peptides from HBV protein sequence.

Drug Description

The therapeutic (synthetic peptide) Hepatitis B vaccine is a new kind of national biological product with full intellectual property rights. Similar products have not been approved to be marketed in China or even in the world. At present, the drug has completed phase I and II clinical trials. Based on the clinical data obtained, the drug shows its unique efficacy and good safety profile in the treatment of chronic Hepatitis B. Therapeutic (synthetic peptide) Hepatitis B vaccine has many advantages: 1) the serological conversion rate of HBeAg was better than that of the first-line treatment drugs, 2) high safety, 3) short course of treatment, fewer times of administration and lower toxicity and side effects, 4) good persistence, no rebound after 300 weeks of withdrawal, 100% persistent serological conversion rate of HBeAg, and no risk of drug resistance, and 5) the effect on HBV DNA reduction is lower than that of nucleoside analogues, but higher than that of interferon.

Safety and Efficacy

The results of general pharmacological studies showed that high dosages in subcutaneous and intravenous injection of HEPA44 had no obvious effect on circulation functions including blood pressure and ECG in animals, and the respiratory function was also not affected by HEPA44

administration. In addition, HEPA44 had no effects on cerebral cortex potential in the parietal lobe of animals, nor did it affect their air righting behavior, and had no significant effect on the pain response in animals.

In the Phase I tolerance clinical trial, the subjects were well tolerated. No serious adverse events occurred during the experiment. In the pilot Phase II study results: patients with chronic Hepatitis B were treated with HEPA44 alone and the combination of HEPA44, gamma-interferon (IFN-γ) and granulocyte-macrophage colony stimulating factor (GM-CSF). Until the follow-up visit, the clinical trial data showed that there was no serious adverse reaction in HEPA44 alone treatment groups, and the safety profile was excellent. The safety profiles in HEPA44 treatment groups were better than those in the combination of IFN-γ, GM-CSF and HEPA44 group.

Developmental Stage

Phase I and Phase II Clinical trials have been completed in China. The results indicated that HEPA44 had promising efficacy and safety profiles. On the basis of Phase II clinical trials, IND was submitted to the FDA to conduct a clinical trial in the US. After the IND is approved, a multi-center, randomized, double-blind, placebo-controlled clinical trial will be conducted in the US to validate the efficacy and safety of HEPA44 in the treatment of patients with chronic Hepatitis B.

Available for out-license or co-development.