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# Professor Sung-Gyoo Park's joint research team develops new hepatitis B drug treatment using U.S. FDA-approved skin treatment drug

☐ GIST (President Kiseon Kim) Professor Sung-Gyoo Park of the School of Life Science and his joint research including CHA Gangnam Medical Center have developed a new method for treating hepatitis B by using U.S. FDA-approved skin treatment drug, raising the possibility of a cure for hepatitis B.

◦ GIST Professor Sung-Gyoo Park, CHA Gangnam Medical Center Professor Yuri Cho, and Seoul National University College of Medicine Professor Yoon Jun Kim demonstrated that ciclopirox * , which has long been used as an anti-vaccine drug, can be used as a new treatment by suppressing the assembly of hepatitis B virus.

* ciclopirox: Synthetic anti-fungal agent used as a skin treatment agent for fungi. In 2013, Rutger University in the U.S. reported its potential as an HIV treatment, and recently passed its first phase as an oral anti-cancer drug.

☐ Domestic hepatitis B virus carriers are steadily decreasing with the introduction of the hepatitis B vaccine, but the rate still exceeds 4 percent of the total population in their 30s and older, with the total

number of patients reaching 3 million. The number of hepatitis B virus carriers worldwide is reaching 250 million.

- Hepatitis B virus is known to be a leading cause of hepatocellular carcinoma in Korea. In chronic hepatitis B carriers, lamivudine, an antiviral drug that inhibits DNA polymerase * has been used. However, new drugs such as Tenofovir and Entecavir have been developed due to resistance caused by mutations in the polymerase.

  * polymerase: an enzyme that replicates DNA to synthesize new strands of DNA

- However, it is very difficult to cure the hepatitis B virus by only inhibiting the polymerase of hepatitis B virus. Accordingly, drugs that inhibit various replication steps of hepatitis B virus are being developed worldwide, and in particular, there is a growing interest in the development of drugs that inhibit the assembly of hepatitis B virus.

□ The research team confirmed through a clinical study that ciclopirox inhibits the assembly of protein particles that make up hepatitis B virus, thereby inhibiting the production of hepatitis B virus.

- The researchers searched over 1,000 substances approved as drugs to develop a treatment for hepatitis B virus, and the US Food and Drug Administration (FDA) has already approved the drug ciclopirox that inhibits the replication of the hepatitis B virus.

- GIST School of Life Sciences Professor Mi Sun Jin found that ciclopirox enters an already assembled hepatitis B protein particle, denatures the structure and releases assembled protein particles, thereby destroying a normal hepatitis B virus.

- CHA Gangnam Medical Center Professor Yuri Cho, who led the nonclinical study, confirmed that ciclopirox, orally administered in a humanized liver mouse * replaced human hepatocytes, inhibited hepatitis B virus. Clinical toxicity testing also suggested that the

toxicity concentration versus the active concentration was high and therefore safe.

* humanized liver mouse: an experimental mouse model in which existing hepatic cells are destroyed and human hepatic cells are implanted

□ GIST Professor Sung-Gyoo Park said, "We will propose a new strategy for the treatment of hepatitis B virus by conducting a follow-up study in combination with existing drug therapies that inhibit polymerase."

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