

**Gwangju Institute of Science and Technology**

**Official Press Release (https://www.gist.ac.kr/)**

 **Section of** Mi-Yeon Kim Nayeong Lee

 **Public Affairs** Section Chief Senior Administrator

 (+82) 62-715-2020 (+82) 62-715-2024

 **Contact Person** Professor Sung-Gyoo Park

 **for this Article** School of Life Sciences

 (+82) 62-715-2511

 **Release Date** 2019.05.17

**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."

□ This research was supported by a grant of the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea and by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education. The research was published on May 16, 2019, in the journal *Nature Communications*.