

Hepatitis C virus proteins in space

September 18 2014



Two researchers at Technische Universität München have won the 'International Space Station Research Competition' with their project 'Egypt Against Hepatitis C Virus.' As their prize, the scientists will see the International Space Station crew perform experiments on the space station. The project involves crystallizing two proteins of the hepatitis C virus under microgravity conditions. The shuttle bringing these proteins to the International Space Station is scheduled to lift off from Cape Canaveral on Sept. 20.

"The hepatitis C [virus](#) is a major problem in our home nation of Egypt," explains Akram Amin Abdellatif, graduate student of "Earth-oriented space science and technology" at the German university TUM and employee at the German Aerospace Center. "We developed this project to learn more about the virus and find its weaknesses," he continues. He established the project together with Hanaa Gaber, a doctoral student at the TUM Institute of Virology.

Egypt has one of the highest prevalence rates of hepatitis C infections in the world. According to an estimate by the Egyptian ministry of health in 2008, around 15 percent of 15 to 59-year-olds are infected. The virus attacks the liver and can cause huge damage to the body including cancer and organ failure.

First Egyptian ISS Nission

The ISS Research Competition is organized by Space Florida – the state's aerospace development organization of Florida – in conjunction with the company NanoRacks LLC. The TUM team submitted their project to the judges in 2012. Just eight projects were chosen to be sent to the ISS from over 600 submissions. EGAHEP was the only project to be chosen from outside the US and will be the first experiment involving Egyptian scientists to be conducted on the ISS.

The researchers want to send hepatitis C virus proteins to the ISS so that protein crystals can be generated in space. Reports with other proteins have shown that crystals produced in space were superior to those grown on earth, where gravity can negatively influence the crystallization. Scientists can then use special x-ray techniques to decode the molecular structure of the proteins from these crystals. "Identifying the precise structures could help us to find new points of attack for medications in the future," explains Prof. Ulrike Protzer, head of the Institute of Virology.

Simultaneous Experiments on Earth and in Space

For their project, the researchers selected two proteins from genotype 4 a specific genotype of HCV that is very predominant in Egypt. The first protein, NS5B, ensures that the genetic material of the virus multiplies in the affected cell during HCV infection. The second [protein](#), NS3, functions as a molecular scissors, cutting a chain of proteins into individual functioning virus proteins during viral replication.

Hanaa Gaber isolated and purified both proteins in the lab. They will be packed in special transport cases called NanoLabs for their September 20 journey to the ISS. The finished crystals will return to earth four weeks later. At the same time, both proteins will be crystallized in a laboratory on earth to provide results for comparison. "We hope that the project will be successful and that the crystals produced in space will represent a giant leap forward," says Gaber, who will be travelling to Florida for the launch.

Provided by Technical University Munich

Citation: Hepatitis C virus proteins in space (2014, September 18) retrieved 25 April 2024 from <https://phys.org/news/2014-09-hepatitis-virus-proteins-space.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.