

Project 9.4 Investigating picornavirus translation initiation as a potential therapeutic target

Promotor: Prof. Gracjan Michlewski, PhD DSc.

Supervisor: Stefan Bresson, PhD

Institute: International Institute of Molecular and Cell Biology in Warsaw

Laboratory: Laboratory of RNA Viruses

www: <https://shorturl.at/kSjot>

Background:

Upon gaining access to a suitable host cell, viruses will hijack the cell's protein synthesis machinery and use it to assemble new viral proteins. One common strategy involves the use of an internal ribosome entry site (IRES), which is able to directly recruit host ribosomes to the viral RNA, bypassing conventional cap-dependent translation initiation. In order to function effectively, IRESs require the assistance of various cellular RNA-binding proteins. These accessory factors, termed ITAFs (IRES trans-acting factors), help the IRES fold into its final, active conformation. Because ITAFs are specifically required for viral but not host translation, they could serve as ideal antiviral drug targets.

Aim:

In this project, we aim to characterize factors involved in IRES-dependent translation of picornaviruses, a diverse family of RNA viruses which includes numerous human pathogens. This work will involve high-throughput screening of a picornavirus IRES library in cells depleted of individual ITAFs. In parallel, we will test known small-molecule inhibitors of various ITAFs in order to determine their therapeutic potential. For particularly promising hits, we will then establish infection models to directly assess antiviral efficacy. Altogether, this work will provide insight into the mechanisms of picornavirus gene expression and potentially identify new therapeutic targets for the treatment of viral diseases.

Requirements:

- Master's degree in biology, biochemistry, or related field,
- solid knowledge in at least one of the following disciplines: molecular biology or biochemistry,
- basic hands-on experience in molecular biology,
- written and spoken fluency in English,
- willingness to learn and take on new challenges, ability to work independently, analytical thinking,
- good interpersonal skills and a collaborative attitude.

Number of positions available: 1

Contact: sbresson@iimcb.gov.pl