

THE DOUBLE-EDGED SWORD EFFECT OF ANTIVIRAL IMMUNITY OVER HUMAN HEALTH AND THERAPEUTIC BACTERIOPHAGES

On January 29 of 2026, CFAI received the visit of **Dr. Francisco Fabián Fuentes Villalobos** from the Laboratory of Immunovirology, Department of Microbiology, Faculty of Biological Sciences, University of Concepción (Concepción, CHILE) who gave a talk on his lines of research associated with the study of the antiviral immune responses.

The recurrent emergence of high-consequence viral pathogens in recent decades has exacted a devastating toll on global public health. Simultaneously, the rise of multidrug-resistant bacteria presents an equally urgent crisis. As obligate intracellular entities, viruses exist in a biological "grey zone," relying entirely on the usurpation of host machinery.

However, humanity currently possesses an unprecedented arsenal of molecular, structural, and computational tools to dissect these phenomena. The presentation of Dr. Fuentes outlined the research framework of his interdisciplinary scientific team, which is dedicated to mapping the complex topology of the host-pathogen interface with the aim at transforming fundamental biological insights into actionable biomedical countermeasures.

With the session Dr. Fuentes described the aims of his laboratory that are: a) Decipher viral hijacking of host cells to define the molecular strategies by which viruses exploit host biochemical and biosynthetic pathways to support their replication, identifying key cellular processes co-opted during the viral life cycle. b) Characterize extra-neutralizing antibody functions. The analysis of adaptive immune responses in convalescent individuals, focusing on Fc-mediated effector functions beyond classical neutralization helps to study how antibody-driven NK cell activation and ADCC act as critical mechanisms linking adaptive and innate immunity in viral clearance. c) Optimizing phage-mediated bacterial control. Through study killing strategies against pathogenic bacteria within the context of a tripartite phage–bacteria–host interaction, the laboratory examines how host immunity shapes phage pharmacokinetics and how premature immune neutralization of therapeutic phages can be prevented to enhance antibacterial efficacy.

The seminar concluded with fruitful discussions on how to strengthen collaborations between the University of Concepción and the CFAI on the specific topic of antiviral immunity research.

