



Instituto Universitario de Investigación
**Biocomputación y Física
de Sistemas Complejos**
Universidad Zaragoza

Jorge A. Cárdenas Pestana

He completed a Bachelor's degree in Physics in 2016. In 2017, he completed a Master of Science in Applied Mathematics at the Universidad Central “Marta Abreu” in Las Villas. From 2021 to 2022, he completed his Master's degree in Marine Resource Management at CICIMAR-IPN, Mexico. His research career has included the application of physicochemical modeling of natural systems, along with the tools necessary for their simulation. In 2021, he joined BIFI, where his research focuses on the immune response and the development of mathematical and bioinformatic models to study tuberculosis infections.



Researcher profile

He is an R1 researcher, with interest in the transcriptional and physiological responses of *Mycobacterium tuberculosis* under stress conditions, particularly iron deficiency. Iron is essential for the bacteria, as it participates in key processes for its survival and virulence. During infection, the immune system restricts its availability, which represents a challenge for the pathogen. He uses bioinformatic analysis and transcriptomics (RNA-seq) to understand how the bacteria adapts its metabolism to survive under these conditions. His work is key to understanding the virulence and resistance of the pathogen, as well as to identifying possible therapies.

Importance of his research

Tuberculosis remains a leading cause of illness and death worldwide. His research focuses on how *Mycobacterium tuberculosis* adapts to stress in infection, seeking vulnerabilities for new treatments.

In addition, he studies how human genetic variability affects the immune response, which could allow the design of personalized therapies. His work, which addresses both bacterial adaptation and host response, could reduce the global impact of tuberculosis.

