

VIRIDIANA ALEJANDRE-CASTAÑEDA, Ph.D.

Professional name: Viridiana Alejandre

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PROFESSIONAL SUMMARY

Research scientist with a Ph.D. in Experimental Biology and hands-on experience in molecular microbiology, medical mycology, fungal genetics, and laboratory research. Specialized in Mucorales biology, fungal pathogenesis, host-pathogen interactions, cell signaling, and mitochondrial oxidative metabolism. Experienced with fungal strain generation and characterization, PCR and RT-qPCR, gene expression, biochemical assays, and infection models. Author and co-author of 13 peer-reviewed publications, with research experience in Mexico, the United States, and Spain.

TECHNICAL SKILLS

Molecular and Fungal Genetics: PCR, RT-qPCR, nucleic acid extraction, gene expression analysis, protein purification, fungal mutant and overexpression strain generation and characterization.

Microbiology and Mycology: Mucorales culture and manipulation; *Mucor lusitanicus* and *Rhizopus* spp.; fungal growth, germination, morphology, and virulence phenotyping.

Host-Pathogen Models: *Caenorhabditis elegans*, *Galleria mellonella*, and *Mus musculus* infection models; survival and host-pathogen interaction assays.

Biochemical and Metabolic Assays: Mitochondrial respiratory activity, oxidative metabolism, reactive oxygen species and hydroxyl radical measurements, rhizoferrin production, iron homeostasis, and spectrophotometric assays.

Analytical Training: Mass spectrometry and biological sample analysis.

PROFESSIONAL EXPERIENCE

Doctoral Researcher, Experimental Biology

Universidad Michoacana de San Nicolás de Hidalgo | Morelia, Michoacán, Mexico | 2020-2024

- Investigated molecular mechanisms regulating Mucorales growth and virulence, including cAMP/PKA and heterotrimeric G-protein signaling, mitochondrial oxidative metabolism, iron homeostasis, and rhizoferrin production.
- Studied effects of host-associated signals on fungal metabolism, signaling, and virulence, including blood serum and host hormones.
- Applied molecular genetics, fungal culture, gene expression, biochemical assays, and host-pathogen approaches to investigate fungal pathogenicity.
- Research contributed to first-author and collaborative publications in peer-reviewed journals.

Visiting Researcher, Department of Biology

University of Texas at San Antonio | San Antonio, TX | Dec 2021-Apr 2022

- Generated and characterized *Mucor lusitanicus* mutant and overexpression strains using molecular genetics and PCR-based methods; performed protein purification.

Visiting Researcher, Fungal Genetics and Molecular Biology

Universidad de Murcia | Murcia, Spain | Dec 2019-Feb 2020

- Generated genetically modified fungal strains and conducted mutation-based experiments to investigate fungal gene function.

Research Trainee, Laboratorio Estatal de Salud Pública

Morelia, Michoacán, Mexico | May-Jun 2023

- Performed nucleic acid extraction and sample preparation for RT-PCR and RT-qPCR workflows in a public health laboratory setting.

Mass Spectrometry Trainee

Universidad del Papaloapan | Tuxtepec, Oaxaca, Mexico | Nov 2022-Apr 2023

- Completed theoretical and practical training in mass spectrometry and biological sample analysis.

EDUCATION

Ph.D. in Experimental Biology | Universidad Michoacana de San Nicolás de Hidalgo | 2020-2024 | Graduated with honors

M.Sc. in Biological Sciences | Universidad Michoacana de San Nicolás de Hidalgo | 2018-2020 | Graduated with honors

B.Sc. in Químico Farmacobiología | Universidad Michoacana de San Nicolás de Hidalgo | 2011-2016 | Graduated with honors

SELECTED PEER-REVIEWED PUBLICATIONS

Patiño-Medina et al. (2026). Metformin exerts a dual effect on Mucorales virulence by altering oxidative metabolism through the regulation of rhizoferrin levels. *Medical Mycology*, 64(6), myag053. <https://doi.org/10.1093/mmy/myag053>

Patiño-Medina et al. (2025). Heterotrimeric G-gamma 1 (Gpg1) participates with G-beta 1 (Gpb1) in the induction of hyphal growth and virulence via the PKA pathway in *Mucor lusitanicus*. *Fungal Genetics and Biology*, 178, 103974. <https://doi.org/10.1016/j.fgb.2025.103974>

Alejandre-Castañeda et al. (2023). Transcription Factors Tec1 and Tec2 Play Key Roles in the Hyphal Growth and Virulence of *Mucor lusitanicus* Through Increased Mitochondrial Oxidative Metabolism. *Journal of Microbiology*, 61(12), 1043-1062. <https://doi.org/10.1007/s12275-023-00096-8>

Alejandre-Castañeda et al. (2022). Secretion of the siderophore rhizoferrin is regulated by the cAMP-PKA pathway and is involved in the virulence of *Mucor lusitanicus*. *Scientific Reports*, 12(1), 10649. <https://doi.org/10.1038/s41598-022-14515-0>

AWARDS AND ADDITIONAL QUALIFICATIONS

Dr. Ignacio Chávez Medal, Universidad Michoacana de San Nicolás de Hidalgo (2025); Recognition for Highest Academic Average, Ph.D. Program (2024); Honorable Mention, Ph.D. (2024) and M.Sc. (2020).

Teaching: Adjunct instructor in specialized software for chemical-biological sciences and environmental chemistry and sustainability (2024-2025); biology induction course instructor (2023); undergraduate thesis co-supervisor (2024).

Languages: Spanish (native); English (intermediate proficiency).