



**Fabricio Medina-Bolivar, PhD**

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**Academic interests:** Plant metabolic engineering, Plant-based production of small molecules

**Research Focus & Techniques of Expertise:** The focus of my research is on the application of “hairy root” cultures for the production of bioactive specialized metabolites. “Hairy roots” are unique tissue culture systems that reproduce the biosynthetic potential of intact plants. My approach is to utilize different stress signals (biotic and abiotic elicitors) to induce the natural biosynthetic pathways present in the roots. In addition, metabolic engineering strategies are utilized to enhance the production of these compounds. Through active research collaborations, these compounds are being tested for different biological activities, such as neuroprotection and anticancer anticancer properties.

**Current Research Projects:**

- Regulation of stilbenoid (resveratrol and analogues) biosynthesis in hairy root cultures of peanut and muscadine grape
- Regulation of carotenoid and sesquiterpene biosynthesis in hairy roots of annatto
- Regulation of phenolic biosynthesis in hairy roots of tomato and *Scutellaria*
- Application of hairy roots to study the effects of environmental toxicants on phenolic metabolism
- Growth of hairy roots and production of inducible bioactive metabolites in bioreactors

**Current Grants:**

**P3-103:** “Regulation, Production and Purification of Bioactive Stilbenoids from Hairy Root Cultures of Peanut”  
**Medina-Bolivar (PI)**, Dolan (Co-PI), Carrier (Co-PI)

**USDA:** “Scutellaria As A Medicinal Crop: Cryopreservation, Hairy Root Culture, Organic Farming and Anticancer Activity”

Joshee (PI), **Medina-Bolivar (Co-PI)**, Prahlad (Co-PI), Shannon (Co-PI)

**P3-202:** “Regulation of Specialized (“Secondary”) Metabolism in Tomato by Genetic Manipulation of the Phosphoinositol Pathway”

Khodakovskaya (PI), Grace (Co-PI), Ali (Co-PI), **Medina-Bolivar (Co-PI)**

**Arkansas Space Grant Consortium:** “Enhancing Abiotic Stress Tolerance and Production of Antioxidants in Plants for Advanced Life Support in Space Exploration”

Khodakovskaya (PI), **Medina-Bolivar (Co-PI)**