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The potential of endophytic actinomycetes of *Amphipterygium adstringens* as producers of novel antibiotics

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Endophytes are microorganisms that inhabit plants without causing apparent damage. It has been found that the interaction between the host plant and endophyte is based on both physical and chemical mechanisms. The secondary metabolism of these microorganisms which allows them to defend themselves or communicate with their host, as well as their unique habitat make them a very interesting source of new molecules with biological activity. Actinomycetes are a group of Gram-positive bacteria that have been extensively studied for their ability to produce a variety of secondary metabolites, especially the genus *Streptomyces*. However, it has recently been found by genome mining studies among some others, that other genera of actinomycetes that have hardly been studied are also capable of producing a large number of compounds. In this study, endophyte isolation was made from the medicinal plant *Amphipterygium adstringens*. Four actinomycetes were isolated: one of the genus *Streptomyces* and three others closest to the genus *Actinoplanes*. Phylogenetic studies place the latter three strains as potential new species. Sequential extracts were conducted, first with dichloromethane (DCM) and then with ethyl acetate (EtAc). The minimum inhibitory concentration was determined with Gram-positive, Gram-negative and a yeast. Extracts from the strain NF3 showed significant activity against the Gram-positive bacteria tested at 0.1µg/mL with DCM and 6.3 µg/mL with EtAc, making it a very attractive strain for further elucidation of bioactive molecules. The extracts from strain TFC3 meanwhile, showed activity against *Bacillus subtilis* with 200 µg/mL in both DCM and EtAc. These same extracts were tested against cancer cell lines MCF7 and HeLa, as well as with with HaCaT as a healthy cell line. The extract from the NF3 strain produced mortality higher than 80% with 0.4 µg/mL in MCF7, 0.8 µg /mL for HeLa and 1.6 µg/mL for HaCaT. The putative *Actinoplanes* extracts had moderate activity only at 200 µg/mL with different cell lines. However, genomic studies of closely related strains indicate that these strains have enormous potential due to the large number of clusters that encode various cryptic secondary metabolite pathways.

Biography

Karol Rodríguez-Peña is a PhD student in Biomedical Sciences at UNAM. He has 40 years experience leading the Industrial Microbiology Laboratory at the Biomedical Research Institute at UNAM. He carried out his Postdoctoral studies at MIT in Cambridge MA. He is Member of the American Academy of Microbiology and has published more than 150 papers in reputed journals. He is the Editorial Board Member of *Applied Microbiology* and *Biotechnology* and Editor in Chief of *Biotechnology*.

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