

Thesis on the activation of secondary metabolites in streptomyces spp

[Science](#), [Biology](#)



for Natural Products.

Degree:

Natural products have had an intimate association with medicine since the dawn of mankind, and the field of pharmacology traces its origins to the use of medicinal plants, animals and microbes (Peláez, 2006). Early civilizations used products available from nature to deal with injuries and disease, and in so doing, often attributed a mystical quality to their world. Bioactive compounds derived from the natural world are responsible for many of the therapeutic effects that our ancestors experienced, and today, these compounds serve as the framework by which scientists develop novel drugs (Butler and Buss, 2006). It is the vastness of the variety of molecules in the natural world that presents a fundamental research base for modern drug discovery. The number of new medicines that are available today which are based on microorganisms, for example, is significant (Singh and Barrett, 2006, Newman and Cragg, 2007) Advances in biotechnology such as high throughput screening have enabled large numbers of biological samples to be screened in a short period of time. Improvements in the fields of genomics and analytical chemistry have enhanced the search for bioactive compounds from natural products. These new technologies have renewed the interest of scientists in pursuing natural product leads, and the increased success rate of drug discovery using natural products has offered the promise of new medicines from a near forgotten source (von Nussbaum et al., 2006).

Under certain conditions, organisms can generate secondary metabolites which have potential biological activities that are useful in medicine.

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Changes in acidity, temperature, oxygen, available nutrients and/or toxins can act to activate silent genes and alter metabolic pathways to generate altered or novel compounds which may have beneficial attributes. In the following thesis, microbial natural products such as antibiotics, antitumor agents and immunosuppressants are described. This is followed by a description of the methods in which secondary metabolites can become activated. An in depth description of *Streptomyces* and various approaches by which to activate secondary metabolism in this microorganism is provided. The aims of the project are discussed, followed by the experimental details. The thesis will conclude with a discussion of how secondary metabolite genes that become transcriptionally activated by chemical and biological cues can yield interesting chemical components which have the potential to benefit both scientific research and medicine.

References

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