

NEWS RELEASE

**UNIVERSITY OF GHANA FACULTY COLLABORATES IN DISCOVERY OF LEGONMYCINS:
FUTURE MICROBIAL AND CANCER FIGHTING AGENTS**

An international research team from the University of Ghana, University of Aberdeen and Wuhan University in China has discovered a set of new alkaloids from a novel Ghanaian microorganism which have great potential as future microbial and cancer fighting agents.

Dr. Kwaku Kyeremeh, a lecturer at the University of Ghana's Department of Chemistry in collaboration with other researchers have identified for the first time, the compounds Legonmycins A and B, named after Legon, a suburb in Ghana, where the producing microorganism was found and isolated.

Legonmycins A and B belong to a group of naturally occurring alkaloids based on the pyrrolizidine backbone. Pyrrolizidine alkaloids (PAs) are produced mainly by plants as a defence mechanism against insect pests and herbivores but, have been used by humans since ancient times for therapeutic and recreational purposes. Interestingly, while over 660 plant pyrrolizidines are known, only up to 10 bacteria PAs have been characterized.

More recent studies have shown PAs to have pharmaceutical importance as anti-tumour and anti-inflammatory agents but, their biosynthetic origins remained poorly understood until now.

Dr. Kwaku Kyeremeh, Dr. Hai Deng, Professor Yi Yu and their colleagues, solved the mystery behind the amino acid composition and other biosynthetic precursors involved in the biosynthesis of bacteria PAs. Using genome analysis and identification of gene clusters, they identified Legonmycins as originating from non-ribosomal peptide synthetases. Inside the *lgn* gene cluster, a talented solo LgnC enzyme was identified and found to catalyse an unprecedented series of chemical reactions in the final steps of the biosynthesis of the Legonmycins.

Dr Hai Deng, from the University of Aberdeen, said the benefit of their work, which is published in the top international journal *Angewandte Chemie Int. Ed.* and featured as the back cover of the journal, is two-fold. "It moves on current understanding of this important group of alkaloids - an essential step forward if the full pharmaceutical potential of these substances are to be realised. The newly discovered compounds could themselves one day be used in the creation of new drug treatments, he said. Dr. Deng further said that, the generation of these analogues depend first on determining the genome sequence of the compounds and then working out how they can be biosynthesised.

According to Dr. Yi Yu, an Associate Professor from Wuhan University, in order to address the problem of resupply, the current research is a great step forward to our ability to use synthetic biology to generate what are known as analogues which are modified versions of the original alkaloids either from plants or microbes but, much suited to human health.

One of the researchers, Dr. Kwaku Kyeremeh, a Lecturer at the University of Ghana's Department of Chemistry said that even though Ghana represents one of the world's biodiversity rich hotspots until recently, very little research had been conducted on the country's flora and fauna. Different accounts of some work on plants, he added, exist but the identification of natural product compounds from microbes is completely new. Dr. Kyeremeh believes that, Ghana has a large number of microbial talents which future research must identify and isolate and noted that the results represent the ultimate goal for this area and type of research and concluded that the current findings are an important step forward to achieving this goal.

The research was sponsored by the Leverhulme Trust and the Royal Society's Africa Award.

About University of Ghana

The University of Ghana is the first and largest university in Ghana with a vision to become a world class research-intensive university. The Department of Chemistry is under the College of Basic and Applied Sciences, University of Ghana. In light of the University's vision, a number of state of the art research equipment including an X-ray Diffractometer and Bruker 500 MHz NMR machine have been acquired for academic research. The Department currently houses a number of research groups in the area of organic, inorganic, environmental and physical chemistry, in addition to several collaborative projects between the Department and other Universities in Europe, Japan and the USA.

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