

Press Release 4th October 2016

Cork scientists develop on arsenal of new natural alternatives to antibiotics

Scientists at the APC Microbiome Institute, a Science Foundation Ireland research institute in Cork, have identified an arsenal of new antimicrobials which can kill many harmful bacteria. The latest antimicrobial, called formicin, is a bacteriocin which is a small bacterially produced antimicrobial protein. The research on formicin has been picked up by the editor of the journal *Microbiology* where it is highlighted and published this week.

“Formicin was picked up in our most recent screening for new antimicrobials. We have identified 20 new small proteins to date including Thuricin and Lacticin 3147” said Professor Paul Ross, who leads the research with Professor Colin Hill at the APC Microbiome Institute in University College Cork and Teagasc. “We plan to further develop these compounds which have important implications for human and animal health.”

Antimicrobial resistance poses one of the biggest threats to global health today. According to the WHO (2015) antibiotic resistance in the European Union alone, is estimated to cause 25,000 deaths and cost more than US\$1.5 billion every year in healthcare expenses and productivity losses. Without effective antibiotics for the prevention and treatment of infections, many of the achievements of modern medicine such as organ transplantations, chemotherapy and surgeries such as caesarean sections become much more dangerous.

“The new antimicrobial, Formicin, was isolated from *Bacillus paralichenformis* APC1576, a bacteria which was originally isolated from the intestine of a mackerel” said Fergus Collins, the PhD student at Teagasc, Moorepark who discovered Formicin. “Formicin can kill a wide range of harmful bacteria including the Gram positive pathogens *Staphylococcus aureus*, *Clostridium difficile*, *Listeria monocytogenes* and *Streptococcus mutans*, a causative agent of tooth decay.”

Formicin is a member of a subclass of bacteriocins called lantibiotics which contain certain modified amino acids. Formicin is made up of 2 lantibiotic peptides. The first peptide likely binds to the cell membrane of the bacterial target and subsequently recruits the second formicin peptide which then inserts into the membrane; the resulting pore formed then causes cell death. Formicin is unique among lantibiotics due to differences in the peptide’s charge and composition.

This research was supported by Science Foundation Ireland through a Research Centre grant to the APC Microbiome Institute.

Full reference:

Formicin - A novel broad spectrum two-component lantibiotic produced by *Bacillus paralicheniformis* APC 1576

Collins F.W., O’Connor, P.M., O’Sullivan, O., Rea, M.C., Hill, C. and Ross R.P. *Microbiology*, September 2016 162: 1662-1671, doi: [10.1099/mic.0.000340](https://doi.org/10.1099/mic.0.000340)

<http://mic.microbiologyresearch.org/content/journal/micro/10.1099/mic.0.000340#tab2>

Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/27450592>

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NOTES for EDITORS

Photo can be downloaded from DROPBOX

LINK <https://www.dropbox.com/sh/tniyy6bpzggrp6e/AAByEVuIRI-r2AGkOImWFY-ia?dl=0>

About the APC Microbiome Institute

APC Microbiome Institute research focuses on the microbial community (the microbiome) that lives in symbiosis both in and on us. The microbiome is comprised of bacteria, yeasts, viruses and bacteriophage that live in harmony with their human and animal hosts, promoting health, and occasionally contributing towards disease. The microbiome provides not only a target for treatment and prevention of disease, it is also a repository for functional food ingredients, new drugs and biomarkers of disease. Since its foundation in 2003, as a partnership between UCC, Teagasc, CIT and industry partners, APC scientists have made several seminal contributions to research - they have related food and microbial diversity with health, have discovered new anti-microbials and anti-inflammatories, and developed templates for future foods.

WHO Factsheet on Antibiotic Resistance

<http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/>

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an immense part of our present and it is key to our success. There is endless potential still to be realised. The growing impact of Irish scientific achievement will make a difference in people's lives, support industry investment, future proof our skill base and involve everyone in the potential of science and innovation. We will continue to question, imagine, collaborate, discover, answer and create. We will make a difference to Irish society and our economy. More importantly, we will make a difference to humankind. See ScienceRising.sfi.ie