Bacteria found in ancient Irish soil halts growth of superbugs—new hope for tackling antibiotic resistance

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The new strain of bacteria was discovered by a team based in Swansea University Medical School, made up of researchers from Wales, Brazil, Iraq and Northern Ireland.

They have named the new strain *Streptomyces sp. myrophorea*.

The soil they analysed originated from an area of Fermanagh, Northern Ireland, which is known as the Boho Highlands. It is an area of alkaline grassland and the soil is reputed to have healing properties.

The search for replacement antibiotics to combat multi-resistance has prompted researchers to explore new sources, including folk medicines: a field of study known as ethnopharmacology. They are also focusing on environments where well-known antibiotic producers like *Streptomyces* can be found.

One of the research team, Dr. Gerry Quinn, a previous resident of Boho, County Fermanagh, had been aware of the healing traditions of the area for many years.

Traditionally a small amount of soil was wrapped up in cotton cloth and used to heal many ailments including toothache, throat and neck infections. Interestingly, this area was previously occupied by the Druids, around 1500 years ago, and Neolithic people 4000 years ago.
Zone of inhibition produced by *Streptomyces sp myrophorea* on a lawn of MRSA. The bacteria is the brown spot, and the lighter color around the spot shows that it is inhibiting the spread of the MRSA which is surrounding it. Credit: G Quinn, Swansea University

The main findings of the research were that the newly-identified strain of Streptomyces:

- Inhibited the growth of four of the top six multi-resistant pathogens identified by the WHO as being responsible for healthcare-associated infections: Vancomycin resistant *Enterococcus faecium* (VRE), methicillin-resistant *Staphylococcus aureus* (MRSA), *Klebsiella pneumonia*, and Carbapenem-resistant *Acinetobacter baumannii*
- Inhibited both gram positive and gram negative bacteria, which differ in the structure of their cell wall; usually gram negative bacteria are more resistant to antibiotics

It is not yet clear which component of the new strain prevents the growth of the pathogens, but the team are already investigating this.

Professor Paul Dyson of Swansea University Medical School said:

"This new strain of bacteria is effective against 4 of the top 6 pathogens that are resistant to antibiotics, including MRSA. Our discovery is an important step forward in the fight against antibiotic resistance.

Our results show that folklore and traditional medicines are worth investigating in the search for new antibiotics. Scientists, historians and archaeologists can all have something to contribute to this task. It seems that part of the answer to this very modern problem might lie in the wisdom of the past."

Dr. Gerry Quinn from the research team said:

"The discovery of antimicrobial substances from *Streptomyces sp.myrophorea* will help in our search for new drugs to treat multi-resistant bacteria, the cause of many dangerous and lethal infections.

We will now concentrate on the purification and identification of these antibiotics. We have also discovered additional antibacterial organisms from the same soil cure which may cover a broader spectrum of multi-resistant pathogens."

The research was published in *Frontiers in Microbiology*.


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