VistaMilk

## MAKING AN IMPACT

# Antibiotic resistance: from soil to food chain

**By Rose Edwin, PhD student, Teagasc**

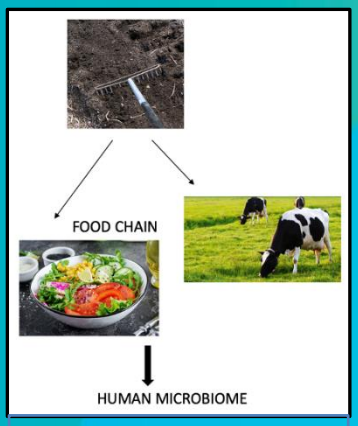


Fig 1. Transmission route of antibiotic resistance genes from soil to human microbiome

Antibiotic resistance has been recognised as a serious threat to human and animal health. The dispersal of antibiotics into the soil through anthropogenic activities has led to the selection, proliferation and dissemination of antimicrobial resistance genes (ARGs) in the environment. There is a growing body of evidence that the ARGs in soil can potentially enter the food chain, and subsequently integrate into gut microbes. However, the sources of antimicrobial resistance in soil and it's transmission into plants remain unclear.

Approximately 70% of soil microbes are uncharacterised; unravelling the complexity of soil microbiomes is our first challenge. As part of my work at VistaMilk, I will use state-of-the-art techniques including metagenomics and machine learning to unravel the DNA profile from 136 soil samples across Ireland. This will enable us to identify the unknown fraction of microorganisms present in the soil. Metagenomic sequencing also facilitates the characterisation of the genetic profile of the microbiome, which can be further examined for genes responsible for ARG. This will help us identify the taxonomy of Irish soil microbes and to analyse the prevalence of antimicrobial resistance genes across the country.

The project, upon completion, will enhance our knowledge of soil microbes in the food chain along with producing a reference soil microbiome database that will serve as an essential resource for soil researchers globally.**For more information please contact; N. Rose Edwin** NiranjanaRose.Edwin@teagasc.ie

## MEET THE RESEARCHER

**Name**: Jennifer Drohan

**Host**: TSSG/WIT

**Role**: PhD student

**Education**: I received a degree in science (BSc) in Molecular Biology and Biopharmaceutical Science from Waterford Institute of Technology WIT in 2020.

**Role at VistaMilk**: I am a postgraduate researcher working in the area of molecular computing and communication for animal diagnostics. The research is a collaboration between the Telecommunications Software and Systems Group (TSSG) and Pharmaceutical & Molecular Biotechnology Research Centre (PMBRC) in Waterford Institute of Technology. My work is centred on the development of genetic circuits comprising engineered cells. The ultimate goal is to integrate this circuit into an implantable device, which can detect and analyse disease-related molecules within the gut of an animal. The device would enable the researcher to monitor the animal in real-time and minimise the need for traditional invasive sampling techniques.

Contact: Jennifer.drohan@postgrad.wit.ie

## NEW STAFF

**Left**: Niranjana Rose Edwin, PhD student, TP 8 Digestive Characteristics
**Right**: Lucile Riaboff, Postdoctoral researcher, PL 4 Analytics
**Above**: Jennifer Drohan, Phd student, TP 5 Animal Health

## FUNDING OPPORTUNITIES

Irish Research Council's Ulysses Scheme providing funding for travel visits to foster new collaborations between Ireland and France-based researchers. Deadline February 4th 2021.

NGI Explorers Open Call: 100%-funded sponsorship programme for 3 or 5-month immersion in the US to work directly with a US partner research team and accelerate your project. Call deadline February 18th 2021. Call details here.

NGI Atlantic Open Call: for EU-US projects on Next Generation Internet. Grants between €50-150k per project for up to 6 months on NGI experimental platforms (AI, Blockchain, 5G, IOT…). Call deadline February 26th 2021. Call details here.

ERA-NETs SusAn, FACCE ERA-GAS, ICT-AGRI-FOOD and SusCrop joint call on "Circularity in mixed crop and livestock farming systems (inc. grassland), with emphasis on greenhouse gas mitigation". Full application tbd in May 2021. Pre-announcement available here.

CELTIC-NEXT for industry and RPO transnational R&D projects on next generation communications for digital society, inc. smart agriculture. Deadline April 12th 2021. Call details here.

**Event**: Launch of Horizon Europe Programme. February 2nd 2021. More info here.

## OTHER NEWS

Congratulations to PhD student at VistaMilk (UCD), **Changhong Jin** who was part of the winning team at the recent Huawei Ireland University Challenge competition. Well done!


## IMPORTANT DATES

Please keep an eye on your emails for registration links to the following upcoming events.

- **9th + 10th March**: VistaMilk internal conference (Vistamilk staff and students)
- **23rd March** -Sensor Masterclass
- **28th and 29th April**: Mid Infrared Workshop

## PUBLICATIONS

**Omega-3 nutraceuticals, climate change and threats to the environment: The cases of Antarctic krill and Calanus finmarchicus**
Alfonso Prado-Cabrero , John M. Nolan
https://doi.org/10.1007/s13280-020-01472-z

**A Model of Decentralized Social Internet of Things using Blockchain Offline Channels**
Subhasis Thakur; John G. Breslin
https://ieeexplore.ieee.org/document/9274459

**The effects of cow genetic group on the density of raw whole milk**
P. Parmar, N. Lopez-Villalobos, J.T. Tobin, E. Murphy, F. Buckley, A. McDonagh, J.A. O'Mahony, S.V. Crowley, A.L. Kelly, L. Shalloo
https://www.researchgate.net/publication/344512654_The_effects_of_cow_genetic_group_on_the_density_of_raw_whole_milk

**An Edge Colouring-based Collaborative Routing Protocol for Blockchain Offline Channels**
Subhasis Thakur; John G. Breslin
https://ieeexplore.ieee.org/document/9284710

**Towards Designing an Explainable-AI based Solution for Livestock Mart Industry**
Parit Mehta, Rudresh Dwivedi, Ciaran Feeney, Pankesh Patel, Muhammad Intizar Ali, John Breslin
https://doi.org/10.1145/3430984.3431071

**Explaining black-box classifiers using post-hoc explanations-by-example: The effect of explanations and error-rates in XAI user studies**
EoinM.Kenny, Courtney Ford, Molly Quinn, MarkT. Keane
https://www.sciencedirect.com/science/article/pii/S0004370221000102?via%3Dihub

**A Service-based Joint Model Used for Distributed Learning: Application for Smart Agriculture**
Dixon Vimalajeewa; Chamil Kulatunga; Donagh Berry; Sasitharan Balasubramaniam
https://ieeexplore.ieee.org/document/9312452