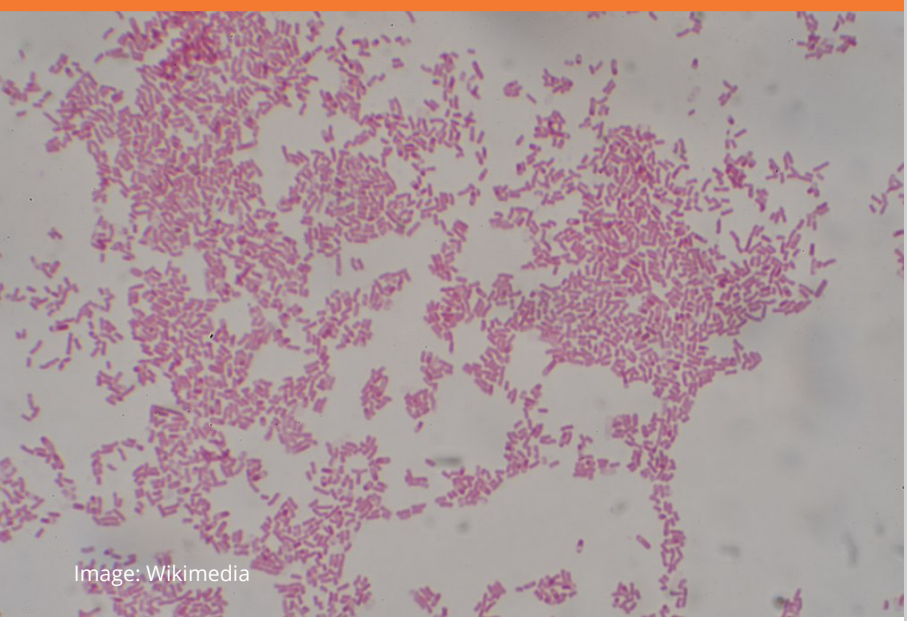

Image: Wikimedia

SHORT TERM MISSIONS

Short Term Missions (STMs) are small travel grants with the aim of:

- Sharing scientific expertise, methodologies, equipment and facilities to harmonise the existing approaches and methodologies within the large
- OHEJP European network
  Driving the research forward in a collaborative and non-duplicative fashion to strengthen both the scientific capacity within the OHEJP
- Contributing to the future prevention, preparedness, detection and response of the EU to foodborne and other emerging threats across human-animal-environmental sectors.

Application of 'Single-Cell Genomics' for the study of the bacterial reservoirs of plazomicin resistance determinants

"Thanks to the One Health EJP I have had the chance to expand my skill sets and learn new methods. Having the opportunity to know a new research centre and discuss my project with very talented people has helped me expand my critical thinking and strengthen my professional confidence. We built a long-lasting collaborative network that I trust can give promising results in the close future.

Bosco Rodríguez Matamoros
Universidad Complutense de Madrid, Spain

Theme:	One Health Missions , Skills Development missions, Antimicrobial Resistance (AMR)
Home Institute:	Universidad Complutense de Madrid, Spain
Mission Hosting Institute:	Karlsruhe Institute of Technology, Germany
Duration of Mission:	3 months

The aim of this mission was for the PhD student to learn about the development of single cell workflows, for the detection of low abundance reservoirs of next-generation aminoglycoside (such as plazomicin) resistance mechanisms. The main objective was to label single cells from complex environments with fluorescence markers specific for the genes of interest. This STM enabled the PhD student to produce results that complemented the ones already produced within the OHEJP PhD METAPRO project using metagenomic analyses.

During this mission, three different labelled probes were designed for the detection of the aminoglycoside resistance gene *npmA*, a gene that confers high level of resistance to all known aminoglycosides, including plazomicin, apramycin and other next-generation aminoglycosides. To test the probes, the *npmA* resistance gene was introduced in two plasmids with different copy numbers to use as positive controls, and the same plasmids without the resistance gene were used as negative controls. All these control plasmids were introduced in *E. coli* cells and a classical fluorescence in situ hybridisation (FISH) protocol was performed with the three probes independently to check their labelling efficiency. Two of the designed probes showed promising results and have the potential to be used with environmental samples. Samples have been taken to evaluate the potential sorting of *npmA* positive cells and is planned to be performed in the upcoming months.

This STM has opened a new collaboration channel between two research groups with different scopes for the study of antimicrobial resistance with a One Health approach. The collaboration between the partner institutes is expected to last longer than the extend of the mission and we expect to produce interesting results than could potentially be published as a research article in a scientific journal.

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