

Project 3

A round-robin to measure the strength of antibiotic interactions to bacterial model membranes

Objectives

The aim of this study is to validate phospholipid model membranes as candidate reference materials for screening antibiotics. The model membranes are assembled on an optical sensor chip and antibiotic interactions are measured by Surface Plasmon Resonance (SPR).

Background

The composition of bacterial membranes has a profound impact on the susceptibility of bacteria to antibiotics. The growing role of membrane modifications in the spread of antimicrobial resistance conforms to a strong shift by industry towards targeting Gram negative bacteria whose outer membrane remains a formidable barrier for most antibiotics. High-throughput screening methods are being developed to enable pipelines of antimicrobial agents with novel mechanisms of action.

Commercialisation barriers exist for reference methods and materials that will make use of qualitative and quantitative responses of antibiotics to membranes. This need is echoed by existing regulatory policies that limit the wide use of advanced therapies (EC/1394/2007; EC/2001/83).

Standardization needs

There is a pre-standardisation need to focus on:

- ability to produce and characterise materials to common (physical) specifications
- assigned values consistent between laboratories and with the protocols of phospholipid bilayer assembly
- procedures for quantitative analysis of the values by reproducible measurements of the highest metrological order
- material validation in biologically native and near-native environments as a function of drug concentration and time

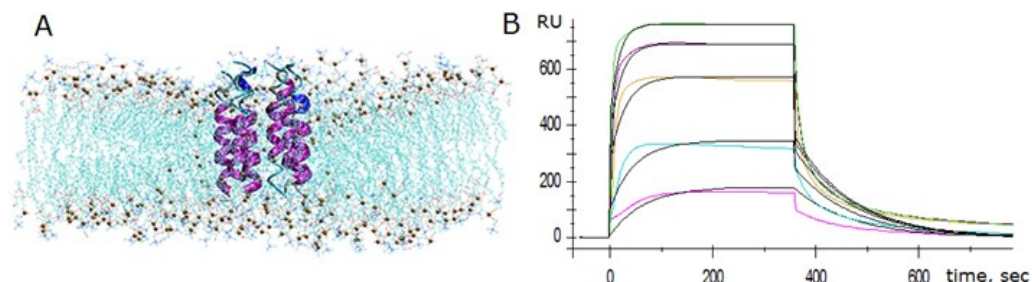
Relevant Standards

[ISO Guide 35](#) Reference materials
[ISO 15189: 2012](#), [BS ISO 29301: 2010](#)
[ISO 15194: 2009](#)
[EU 2017/746](#): IVD regulation

Relevant Committees

[ISO/TC 276](#) - Biotechnology
[ISO/TC 229](#) - Nanotechnologies
 BIPM – [CAWG](#), [PAWG](#)

Call for Participation



(A) Molecular dynamics simulation of a transmembrane antibiotic (magenta) inserted into a phospholipid bacterial membrane.
 (B) Sensograms showing the strength of antibiotic interactions on the membrane assembled on an SPR chip.

Work Programme

- Materials will be assembled and on SPR chips for distribution
- Material characterisation by SPR will be undertaken by the participating laboratories
- Analysis of the results including statistical evaluation

Second stage analysis

- Procedures developed will be repeated by a smaller group of participants to determine the effect of test parameters on the repeatability and reproducibility of the measurement.

Knowledge Transfer

International round-robin tests, good practice guidelines, peer-review publications and presentations.

Status

Study In progress since May 2018.

Additional Volunteers Welcome

Participants fund their own study in the project

For more information on participation, please contact:

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