Practical course in Medical Nanotechnolgy, Karolinska Institutet, 22-23 May 2017 - Schedule

Day 1 – May 22
09.00 – 10.00 Course introduction
10.00 – 11.30 Practical 1
11.30 – 13.00 Practical 2
13.00 – 14.00 Lunch
14.00 – 15.30 Practical 3
15.30 – 17.00 Practical 4
18:30 – Course dinner

Day 2 – May 23
09.00 – 10.00 Day 2 intro. Data acquisition exercises provided
10.00 – 13.00 Data acquisition and completion of data analysis worksheet
13.00 – 14.00 Lunch
14.00 – 17.00 Analysis of data from morning practical

Practicals:
All practicals will be 1 hour 30 minutes, which includes an introduction by the practical leader as well as a debriefing. Each practical group will contain 2- 3 persons and the practical leader will be responsible for 2 groups at a time. Each practical will be run 4 times throughout the day to give each student the chance to participate in all practicals. The topics chosen reflect novel technologies from the nanomedicine field that have direct applicability to infection biology.

Practical 1 – Nanoparticles:
Nanoparticles are widely used in nanomedicine, often in conjunction with other technologies such as small molecules and biologics. This practical is designed to let students synthesize their own simple nanoparticles as well as characterize the efficiency and success of the synthesis. Link: http://www.sciencedirect.com/science/article/pii/S0168365916300074

Practical 2 – Optotracing – Luminescent Conjugated Oligothiophenes (LCO's) to detect bacteria.
In this practical, we will demonstrate the use of a brand new technology called Optotracing. We will use small molecular weight synthetic Luminescent Conjugated Oligothiophenes that bind specifically to components of bacterial biofilm. Students will use spectrophotometric techniques to measure the binding of LCO's and establish if specific component of bacterial biofilm are being expressed.
Link: http://dx.doi.org/10.1038/npjbiofilms.2016.24

Practical 3– Antimicrobial susceptibility testing (AST)
Students will determine the antibiotic resistance profiles of clinical isolates using nanowell technology. This platform has the ability to perform 675 AST's simultaneously. Students will then use their findings to infer treatment decisions, relating the work back to the clinical situation.
Link: http://jcm.asm.org/content/52/9/3310.long

Practical 4 – Sensing on PEDOT

Students will produce a simple biomimetic device which will consist of a conducting polymer called PEDOT. They will use the polymer to mimic certain characteristics of a biological surface and electronically detect when bacteria start to grow. Students will determine the earliest possible time point when growth can be detected.

Link: http://pubs.rsc.org/en/content/articlelanding/2015/tb/c5tb00382b