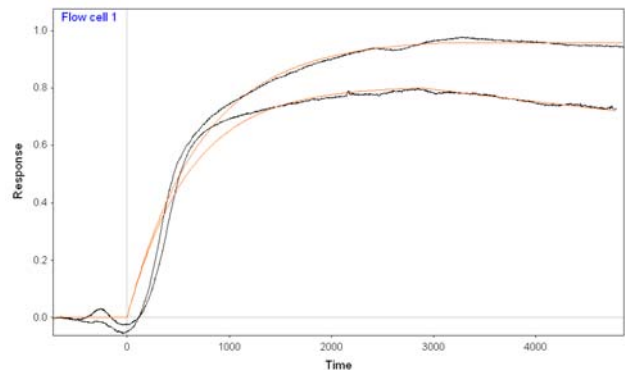
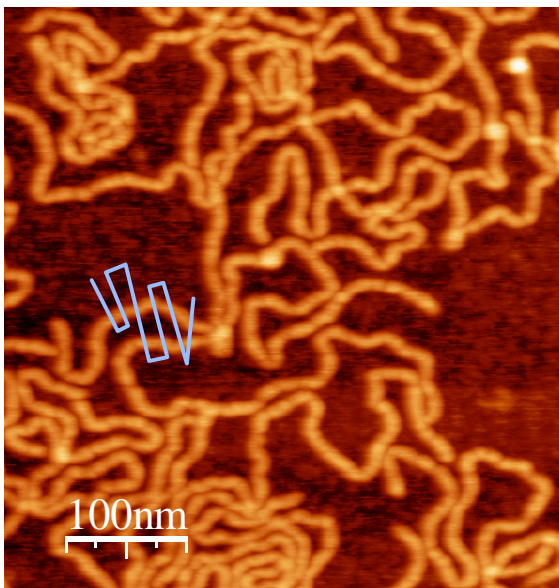


Study of DNA-AMP interaction using SPR and AFM.

Supervisors: Leonid Gurevich and Peter Fojan.

Antimicrobial peptides (AMPs) have been found to be anti-fungal, anti-bacterial and also anti-viral, amongst them are some that are active against HIV-1. The generally accepted first attack of an antimicrobial peptide is through interaction with the cell wall and successive destabilization of the cell wall of the target organisms. However this cannot explain antiviral and anticancer activity of the AMPs. Moreover as recent experiment carried out in several research groups (including us) showed, in many cases the cell envelop stays relatively intact after AMP treatment. This leads to conclusion that AMP can also attach other intracellular target, first of all DNA. We have recently showed that several AMPs including crabrolin, indolicidin and there variants have strong affinity to DNA. The AFM images show that upon exposure to AMPs they form a continuous coat around the DNA molecules. This observation was further confirmed by SPR (Surface Plasmon Resonance sensing) measurements showing high affinity and low dissociation constant for IL4-DNA interaction (see figures).

In this project we propose to perform a systematic study of indolicidin, IL4 (indolicidin variant) and crabrolin using SPR and AFM. Within the project you will synthesize and purify the AMPs and study DNA-AMP interaction study using Nanoscope AFM and Reichert SR7000DC SPR instruments.



Left panel: AFM image of dsDNA (pUC19 SmaI digest) exposed to 11 μ M of 4-Indolicidin. The average height (diameter) of the complex is approx. 2nm while the height of native DNA is in the range of 0.6-1.0 nm depending on imaging condition. Right panel: SPR curves corresponding to association/dissociation of IL4 to a dsDNA – coated substrate.