SPR, AFM - a study of living cells for the diagnosis of oncological diseases

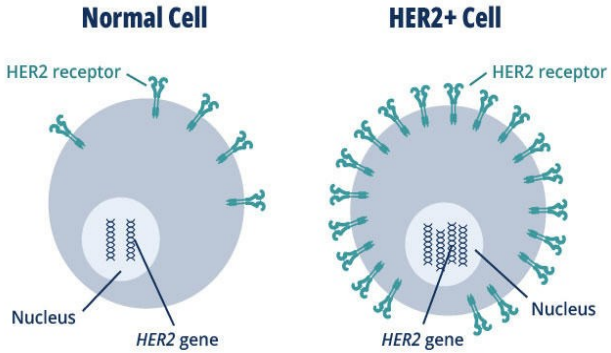
MICHAELA DOMŠICOVÁ

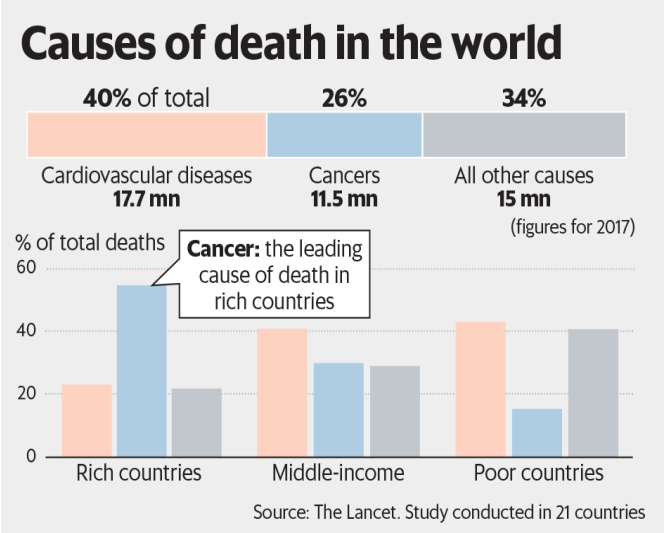
Šimon Klimovič, Radka Obořilová, Jan Přibyl, Alexandra Poturnayová

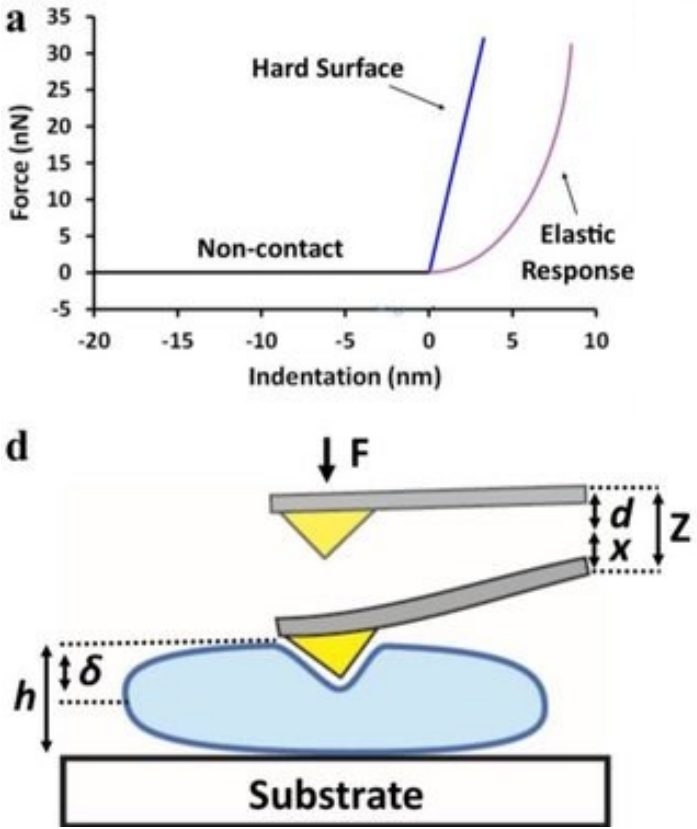
Current state and premises

Problem:
High cancer incidence

Possible solution:
Nanotechnology for biomarker detection







The use of AFM as a diagnostic tool

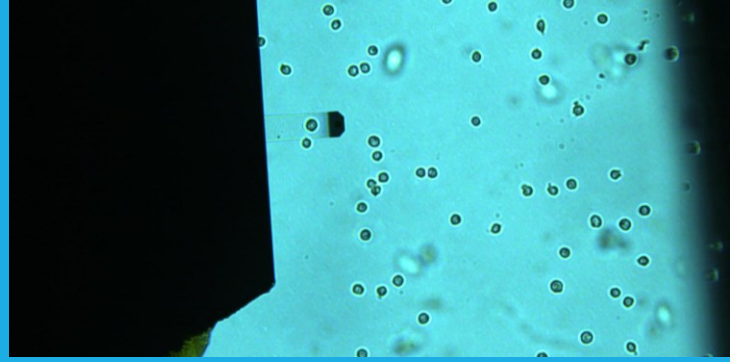
Mechanical properties of cells define their function, mobility, differentiation.

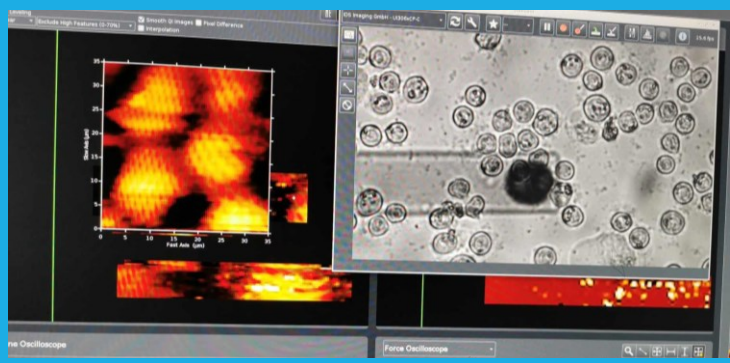
Elasticity of cell membranes is affected by biomarker expression.

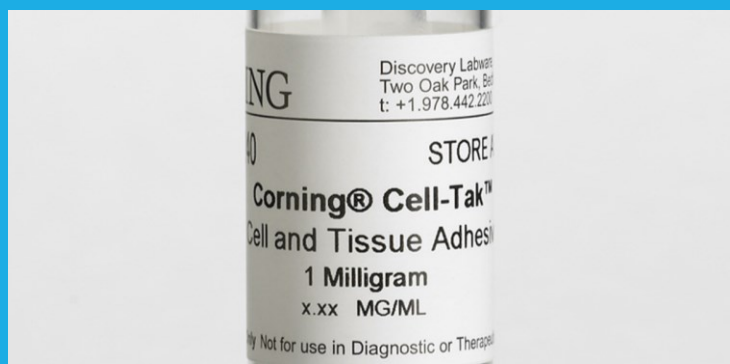
Goal: determining the elasticity modulus for diagnosis of oncological diseases.

Sample preparation and AFM measurements

- immobilisation of suspension and adherent cells on dish
- correct cantilever: SD-qp-SCONT-TL-10
- experimental conditions
- contact mode force mapping measurements for cell lines and patient samples

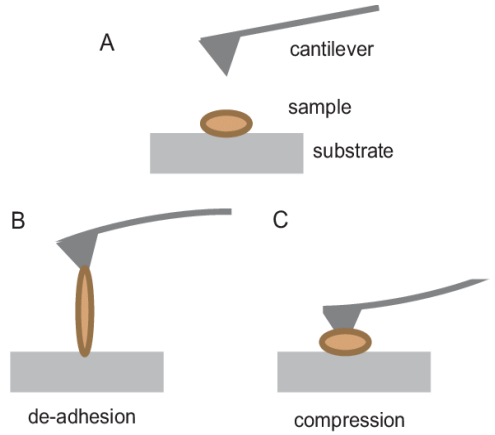


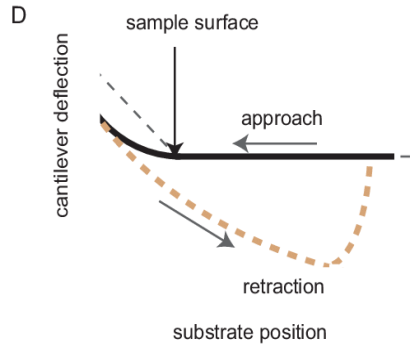


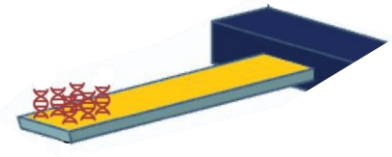


Future plans

- modification of cantilever with sensing molecules for biomarker detection
- use of sensing molecule – AuNPs complexes to visualize biomarkers

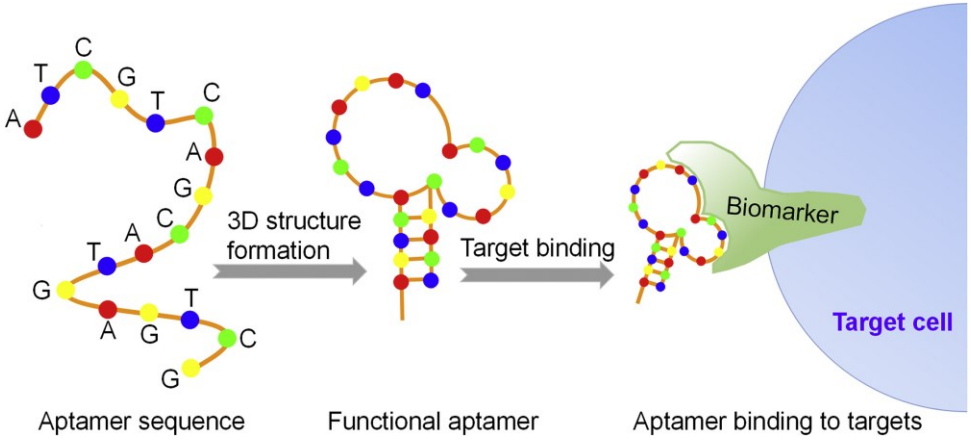


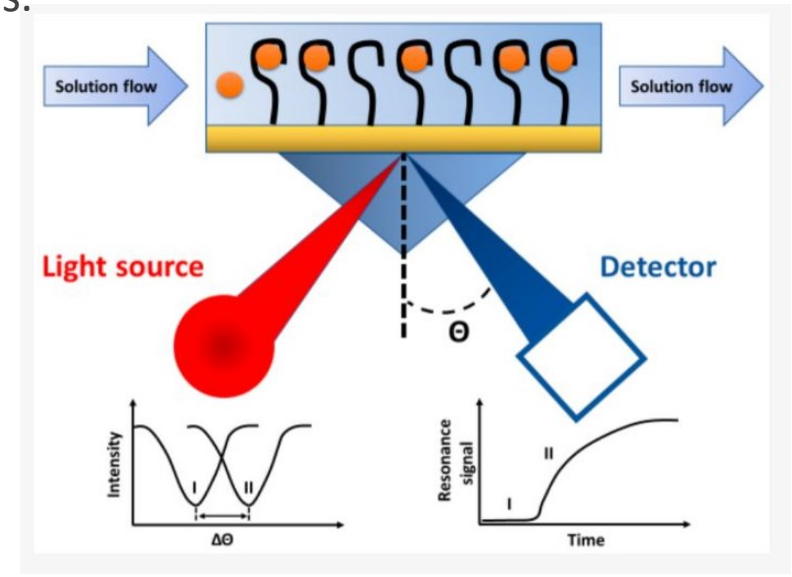




SPR – nanobiosensors in biomarker detection

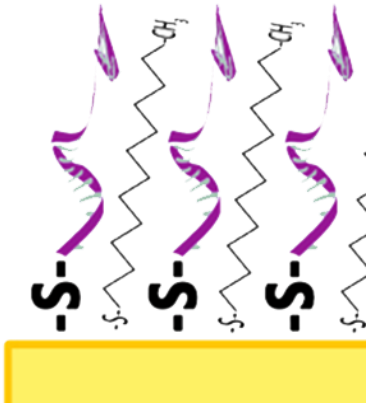
SPR – optical biosensor for real time monitoring of molecular interactions.
Aptamers have great potential as sensing molecules.

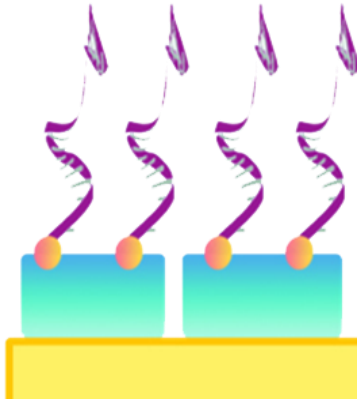




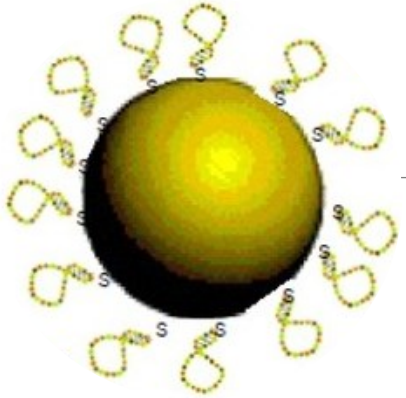
Sample preparation and SPR measurements

- aptasensor design
- modification of sensor surface in flow and by incubation
- optimizing experimental conditions
- monitoring interactions between aptamer and cell lines expressing biomarker
- measurements with cell lines

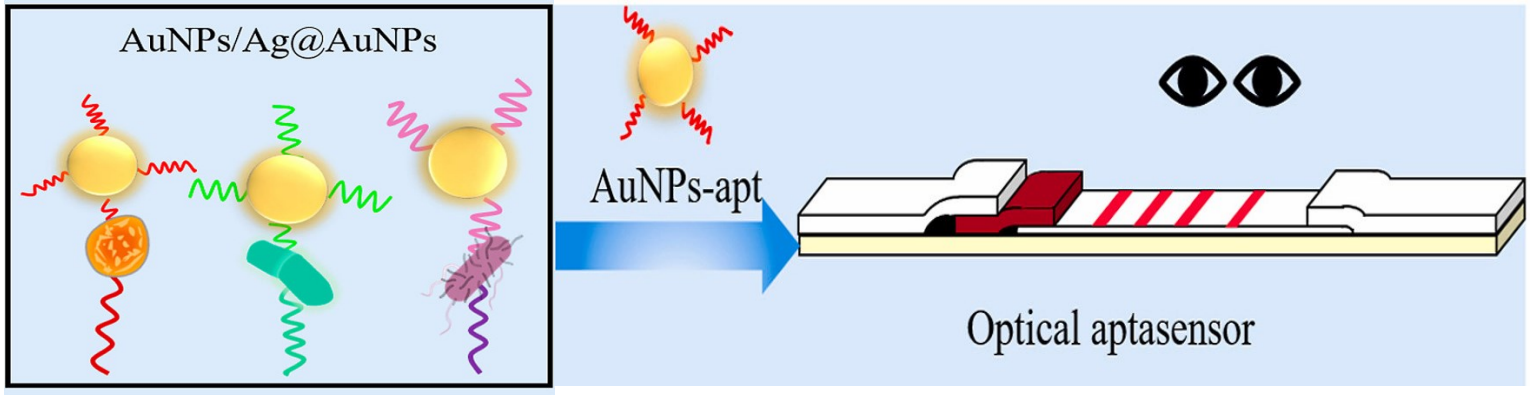




Future plans



- testing patient samples
- implementing aptamer – AuNPs complexes to enhance detection signal



NSP
Národný štipendijný program
NATIONAL SCHOLARSHIP PROGRAMME OF THE SLOVAK REPUBLIK

CIISB
Czech Infrastructure for Integrative Structural Biology