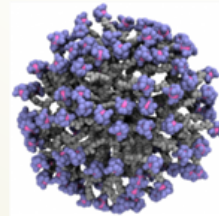


Nanomechanical tool for characterization of cellular immune response

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CANCER NANOMEDICINE - FROM THE
BENCH TO THE BEDSIDE





Cancer and inflammation

- connection proposed in 19th century
 - inflammation and tissue damage contribute to development of oncology diseases
 - both acute and chronic inflammation
 - tumour microenvironment: innate and adaptive immune cells, cancer cells
- 



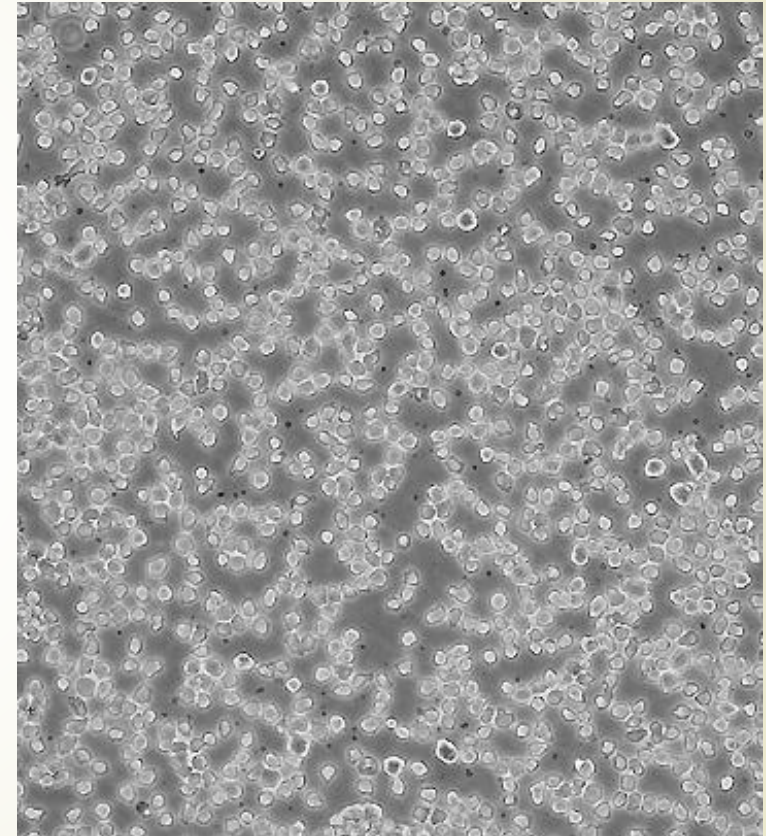
Immunotherapy

- ▶ cellular immune response play a major role in immunity against tumour
- ▶ immunotherapy – revolution in cancer therapy
- ▶ innate immune response – macrophages – critical role in inflammation processes
- ▶ mediating phagocytosis of cancer cells

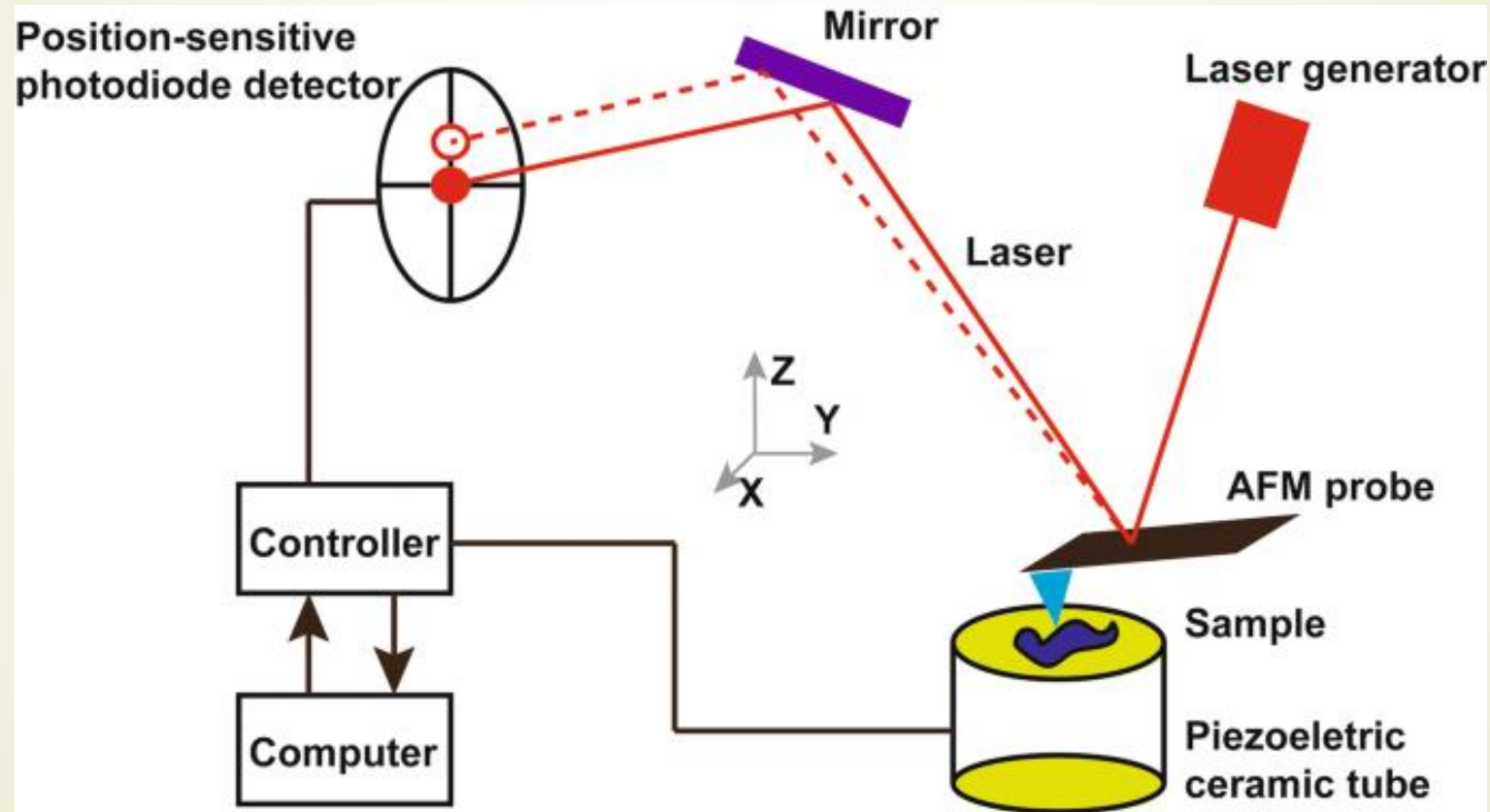
In vitro model

THP-1 cell line

- ▶ human monocytic cell line
- ▶ derived from acute monocytic leukemia patient
- ▶ differentiation into macrophages with PMA




Atomic force microscopy (AFM)






Atomic force microscopy (AFM)

- ▶ nanometer-scale investigation for cells
 - ▶ application in cancer research and diagnosis
 - ▶ change of nanomechanical properties during carcinogenesis
 - ▶ morphology, elasticity, adhesion properties
- 



Planned activities

- ▶ training and education on AFM techniques in general and AFM methods developed in Artidis AG
 - ▶ establish and maintain stable THP-1 cell line
 - ▶ perform measurements on live and fixed cells
 - ▶ test different methods in characterization of THP-1 cell line
- 



Measurements

- ▶ small Petri dishes, 34 mm diameter
- ▶ live and fixed cells
- ▶ 8 spots in the center of the dish
- ▶ 40 μm x 40 μm area
- ▶ 1024 force curves per area
- ▶ treated and non-treated cells (control)

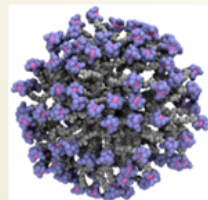


Results

- ▶ results are being analyzed in cooperation with Artidis AG
- ▶ Artidis AFM device is installed at the Institute of Medical Research and Occupational Health in Zagreb
- ▶ collaboration between Artidis and applicant's group is continued on this and other experiments for analysis of mechanical properties of different cell lines

Acknowledgements

Short Term Scientific
Mission (STSM) grants



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