Studying the “phagocytic” behavior of cancer cells in different mechanical conditions

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In various cancer types, cell deformability is tightly correlated with their metastatic potential, partially because deformability may also contribute to dissemination from solid tumors. Cell morphology is closely associated to cytoskeletal deformability: well-spread cells are stiffer than round cells, primarily because of higher cytoskeletal stress in these cells. Mechanical properties of cells control not only their ability to migrate and to colonize in different mechanical environments, but also their ability to deform, engulf and uptake sub-micron and micro-particles.

Surface stiffness can mimic the mechanical properties of varying physiological microenvironments. Therefore, our objective is to study how the surface rigidity affects the uptake of particles by cancer cells. By monitoring the internalization of particles of different sizes into cells, we were able to find a link between the cell capacity to spread and deform and their “phagocytic” potential. Moreover, cell deformability and uptake patterns were found to be closely correlated to the metastatic potential, as shown for human pancreatic cancer cells. Our results lay the basis to developing a method to predict the biodistribution and targeting of drug vehicles in different organs and in tumors at different stages, based on their mechanical properties.

Katerina Tischenko – Curriculum Vitae (CV)



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Education

2018 – present: The Hebrew University Center for Nanoscience and Nanotechnology
M.Sc. student in Pharmacological and Medicinal Sciences program, with expertise in nanotechnology, member of Prof. Ofra Benny's lab
Research project: Studying the interactions of cancer cells with nano carrier drug delivery systems and developing an experimental/informatics scheme for rational design of drug carrier for personalized medicine

2013 – 2017 The Hebrew University of Jerusalem
B.Sc. in Pharmaceuticals, *graduated with honors*

2007 – 2010 Mevoot Hanegev High School, Kibbutz Shoval
Graduated with honors

Employment

2017 – 2020 Licensed pharmacist, pharmacy of Clalit Healthcare System
Dispensed medications, prevented negative drug interactions and mistaken prescriptions, worked with doctors and suppliers
Gave presentations to the medical staff every two weeks about changes in healthcare guidelines and new drugs on the market

2013 – 2017 Pharmacist-in-training, pharmacy of Maccabi Healthcare System
Assembled people's prescription orders, received shipments, arranged inventory
Assisted the pharmacist and provided service to the patients

2012 – 2013 Instructor and shift supervisor in Beit Hashahaf – rehabilitation hostel for youth at risk
Assigned and oversaw three instructors per shift, maintained the schedule, made decisions during outbreaks/conflicts
Helped residents function in daily life, develop social skills, improve their personalities and self-image
Provided developmental and cognitive stimulation, sex education, and occupational skills

Scholarships and Awards

2017 – Scholarship for Excellence from the Israel Pharmacists Association

Academic Achievements

2019 – Poster presentation at the Israel Society for Biotechnology Engineering (ISBE) conference

2019 – Poster presentation at the 8th Annual Nanoscience and Nanotechnology conference

2019 – Poster presentation at the Israel Society for Medical and Biological Engineering (ISMBE) conference

2018 – Poster presentation at the Israel Controlled Release Society (ICRS) conference