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Ofra Benny is an Associate Professor at The Hebrew University of Jerusalem (HUJI) and the Head of the Lab for Nanomedicine and Tumor Microenvironment. She is the Director of the Pharmaceutical Science Section at The Institute for Drug Research at HUJI. Her Multidisciplinary research focuses on nanomedicine, 3D-printing and microfluidics for drug delivery, and AI based diagnostics in cancer. Prof. Benny holds ERC-starter and ERC-POC grants focused on biomechanical interactions of nanoparticles and cancer cells for personalized therapy. Her research led to many patents as well as publications in leading journals such as *Nature Biotechnology* and *Science Advances*. Prof. Benny is the Director of The Fraunhofer Innovation Platform for Drug Discovery and Delivery at HUJI (FIP_DD@HUJI), a center for Germany-Israel collaborations. Her postdoctoral training was done in The Harvard Medical School and Boston Children's Hospital in Judah Folkman's Lab.

Abstract:

Tumor on a Chip and Personalized Nanomedicine

Personalized therapy is one of the most promising directions in treating cancer. Tailoring the most effective therapy as well as individualized designing of drug delivery is crucial for achieving maximal clinical outcomes with minimal toxicities. Our unique "Tumor on a Chip" technology is designed to enable the long-term growth and maintenance of 3D multicellular spheroids originated from patient biopsies. In addition to measuring drug effects, we developed a computational scheme to predict cancer aggressiveness and probability of drug resistance, by measuring interactions of cancer cells with nanomaterials. Using Machine Learning, we could detect patterns of nanoparticle uptake by cells that are linked to the biomechanical properties of cancer cells and their function. A precise control over the physical parameters of nanoparticles was achieved using microfluidics, providing both the possibility of diagnostics and precision nano- drug delivery.