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# Dr. Zilberberg, Ph.D.

Dr. Zilberberg joined CDI from the John Theurer Cancer Center and the Department of Biomedical Research at the Hackensack University Medical Center. The focus of Dr. Zilberberg's work is the development of technologies that enable a more efficient study of tumors that metastasize to the bone and potential treatments for them.

Tumor metastasis and many forms of bone-related complications are difficult to study because: (1) human tumor cells rarely metastasize to animal bones, (2) patient-derived tumor models are costly, time consuming, and often difficult to execute, (3) immortalized cancer cell lines are incapable of capturing tumor cell complexity and heterogeneity, and importantly (4) in vitro models fall short of recapitulating the in vivo phenotype and functions of major bone cells, i.e. osteocytes.

Dr. Zilberberg and her laboratory, in collaboration with the Stevens Institute of Technology, have developed culture platforms that mimic key elements of the bone niche and the way bone would respond to different stimuli and conditions. Third and fourth generations of these platforms are expected to recapitulate more complicated physiological aspects of the bone and bone marrow microenvironment, while providing even greater high-throughput capabilities to end-users.

The implications for their technology are numerous, but there are specific ways in which it is currently utilized. It has been proven to be useful for the ex vivo preservation of multiple myeloma cells. There is a strong dependency of multiple myeloma with the bone marrow in which it resides. Dr. Zilberberg's technology recapitulates key elements of the myeloma tumor niche, which keeps viable malignant patient-derived cells for > 3 weeks. The platform is currently been utilized for: (1) pre-clinical evaluation of novel compounds including cellular immunotherapies, (2) studying pathways associated with drug resistance in myeloma, and (3) developing the capability for personalized drug screenings using directly patient biospecimens.

The biomimetic bone constructs have been used not only in multiple myeloma, but to study the interaction between tumor cells and the bone metastatic niche of other cancers as well. One current topic of interest for Dr. Zilberberg's lab is prostate cancer and the effects of this tumor on osteocytes. Because the construct recreates key phenotypic and genotypic features of osteocytes, the researcher has the prime environment to learn more about the role of bone and bone-derived cells in the development of metastatic cancers.

Dr. Zilberberg's research has been published in Lab on a Chip, Nature Scientific Reports, and Nature Bone Research, among other publications. Current and past funding support for her research has been provided by the National Cancer Institute, the National Institute of Arthritis and Musculoskeletal and Skin Diseases, the National Heart, Lung and Blood Institute, as well as pharmaceutical companies Celgene and Celularity.