

9<sup>th</sup> International Conference and Exhibition on

# TISSUE ENGINEERING AND BIOBANKING

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# TISSUE SCIENCE AND REGENERATIVE MEDICINE

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## Bone mimicry models: Cancer metastasis and refuge in bone

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**B**one microenvironment is a complex milieu composed of inorganic and organic components. In addition to its mechanical and chemical role, this microenvironment gives rise to heterogenous molecules and cells that in many cases interacting in an orchestrated manner and control signaling pathways that enable bone development and maintenance. Solid cancers originating in the breast, prostate, and lung tend to metastasize to bone. Once deployed in bone, these tumor cells harness this microenvironment, shift to a quiescent mode or initiate a vicious cycle that often leads bone destruction and gain an increased tumorigenicity by mechanisms which are not yet fully understood. Here, we introduce a new three-dimensional model which closely resembles a living natural bone that can be used to study cellular and molecular cues in bone tumors and metastasis. Using this model, we showed that the mineral phase may have an important role on cellular characteristics such as, proliferation rates and tumorigenicity. We also revealed that interactions with mesenchymal stem cells (MSC's) increased migration and invasion capacities along with osteosarcomas (OS) proliferation, moreover we showed that via regulation of pathways such Wnt, cadherins, Notch and their downstream target genes such as *c-Myc*, these capacities were further enhanced when accommodated with the bone like biolattice and directly interacted with the MSCs. We also suggest that progression in OS aggressiveness can also be attributed to a transition in Wnt signaling from canonical to noncanonical pathways, which is intensified in presence of MSCs. We suggest these kinds of tumor promoting interactions may be found in the natural and tumorigenic bone microenvironment. New insights on the interplay between these signaling cues and their effects tumor progression will be discussed. A better understanding of the molecular signaling mechanisms involved in the tumor development and bone metastasis may contribute to development of new cancer therapies.

### Biography

Razi Vago has completed his graduation in BSc (1982-1985) from Bar-Ilan University, Department of Life Sciences, Ramat-Gan, Israel and MSc (1986-1988 from the same university. He worked under advisor ship of Prof. Zvy Dubinsky completing his thesis: Mutual relationships in the biological association between the hydrocoral *Millepora dichotoma* and the Cirripede *Savignum milleporum* and completed his PhD (1989-1994) from Bar-Ilan University, Department of Life Sciences, Ramat-Gan, Israel. Prof. Zvy Dubinsky as Advisor, he also completed a thesis on Environmental factors and the dynamics of growth processes in hermatypic organisms.

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