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Growth, migration, and stress: Filling in the "gap"

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Gap junctions promote intercellular communication that mediate the passage of molecules up to 1 kDa between cells. These molecules have been demonstrated to either inhibit or promote cell growth, thus defining gap junctions as either tumor suppressors or promoters of growth and metastasis. Although various defining molecular and clinical studies have been reported, there has been limited data to explain these seemingly conflicting results. In this report, the mechanism for how different connexins selectively promote growth through redistribution of cAMP is elaborated. In addition, the selective roles of gap junctions in migration which can affect metastasis is expanded and the key molecular molecules are defined including the mechanism for promotion of the epithelial to mesenchymal transition (EMT) and metastasis. Another role for gapjunctions is to transfer molecules that promote oxidative stress and apoptosis. This occurs by a mechanism known as the bystander effect by which stress applied directly to cells can affect adjacent and distal cells through gap junction communication. This can affect cancer therapy and identify novel ways to target cancer cells with limited side effects. We propose a novel therapeutic approach which has been demonstrated to decrease tumor volume in mice and may have clinical potential.

Biography:

Shoshanna N. Zucker received her PhD in Molecular Pharmacology at Albert Einstein College of Medicine in the laboratory of Dr. Susan B. Horwitz who is well known for the discovery of the mechanism of action of taxol. Dr. Zucker did her postdoctoral work at the University at Buffalo where she focused on gap junctions in cancer. She was a recipient of an NIH NRSA fellowship. She specialized in melanoma research at Roswell Park Cancer Institute where she was a first author of several papers including a Molecular Cell study of oxidative stress in melanoma. In 2013, Dr. Zucker became an Assistant Professor at the D'Youville School of Pharmacy. Dr. Zucker established her independent research in the area of novel therapeutic approaches to cancer therapy utilizing oxidative stress-inducing mechanisms. She supervises many students and continues active collaborations with the University at Buffalo and Roswell Park Cancer Institute.