Venom Peptides Attack Cancer Using a Channelopathy Strategy

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Animal venoms are comprised of a diversity of peptides that manipulate specific molecular targets such as ion channels and receptors. Increasingly cancer is being viewed as a channelopathy because the passage of ions via ion channels and transporters mediate the regulation of tumor cell survival, death, and motility. As a result, a potential targeted therapy for cancer is to use venom peptides that are selective for ion channels and transporters overexpressed in tumor cells. Venom peptides have been shown to mediate anticancer activity via interactions at tumor cell membranes and as intracellular components affecting cell migration, invasion, and angiogenesis—all major functional mechanisms of tumor growth. Cell migration and tumor vascularization specifically, are often associated with changes in ion channel expression and/or activity. In particular, calcium channels are of importance because calcium is the key messenger regulating signaling pathways in cellular processes that advance tumor proliferation, apoptosis, transcription, migration, and angiogenesis. This talk will highlight how venom peptides are being used to promote a strategy to examine and develop treatments for cancer as a channelopathy, with a specific focus on a group of non-traditional venomous organisms, the Terebridae (auger snails).