Novel bee venom derivative forms a nanoparticle 'smart bomb' to target cancer cells

August 2 2010

The next time you are stung by a bee, here's some consolation: a toxic protein in bee venom, when altered, significantly improves the effectiveness liposome-encapsulated drugs or dyes, such as those already used to treat or diagnose cancer. This research, described in the August 2010 print issue of the *FASEB Journal*, shows how modified melittin may revolutionize treatments for cancer and perhaps other conditions, such as arthritis, cardiovascular disease, and serious infections.

"This type of transporter agent may help in the design and use of more personalized treatment regimens that can be selectively targeted to tumors and other diseases," said Samuel A. Wickline, Ph.D., a researcher involved in the work from the Consortium for Translational Research in Advanced Imaging and Nanomedicine (C-TRAIN) at the Washington University School of Medicine in St. Louis, Missouri.

To make this discovery, Wickline and colleagues designed and tested variations of the melittin protein to derive a stable compound that could be inserted into liposomal nanoparticles and into living cells without changing or harming them. They then tested the ability of this protein, or "transporter agent," to attach to different therapeutic compounds and enhance drug therapy without causing harmful side effects. In addition, their results suggest that the base compound which is used to create the transporter agent may improve tumor therapy as well.

"Our journal is abuzz in a hive of bee-related discoveries. Just last month, we published research showing for the first time how honey kills bacteria. This month, the Wickline study shows how bee venom peptides can form "smart bombs" that deliver liposomal nanoparticles directly to their target, without collateral damage," said Gerald Weissmann, M.D., Editor-in-Chief of the *FASEB Journal*.

More information: Hua Pan, Jacob W. Myerson, Olena Ivashyna, Neelesh R. Soman, Jon N. Marsh, Joshua L. Hood, Gregory M. Lanza, Paul H. Schlesinger, and Samuel A. Wickline. Lipid membrane editing with peptide cargo linkers in cells and synthetic nanostructures. FASEB J. 2010 24: 2928-2937. doi:10.1096/fj.09-153130

Provided by Federation of American Societies for Experimental Biology