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Delivery of lethal dsRNAs in insect diets by branched amphiphilic peptide capsules.

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In this study we inhibited expression of two insect genes, BiP and Armet, through the ingestion of dsRNA complexed with Branched Amphipathic Peptide Capsules (BAPCs). The dsRNA- BAPCs complexes were added to the diets of two insect species from two Orders: Acyrthosiphon pisum and Tribolium castaneum. The gene transcripts tested (BiP and Armet) are part of the unfolded protein response (UPR) and suppressing their translation resulted in lethality. For Acyrthosiphon pisum, ingestion of <10 ng of BiP-dsRNA associated with BAPCs led to the premature death of the aphids (t1/2 = 4 - 5 days) compared to ingestion of the same amounts of free BiP-dsRNA (t1/2 = 11-12 days). Tribolium castaneum was effectively killed by ingestion (by larvae only) using a combination of BiP-dsRNA and Armet-dsRNA complexed with BAPCs (75% of the subjects, n = 30) died as larvae or during eclosion (the emergence of adults from pupae). Feeding the two dsRNA alone resulted in fewer deaths (30% with n = 30). These results show that complexation of dsRNA with BAPCs greatly enhances the oral delivery of dsRNA over dsRNA alone in the diet. This approach provides a simpler method of delivering dsRNA compared to microinjection for studying *in vivo* protein function and for developing novel strategies for pest management.

Biography

L A Avila has completed her PhD in Biochemistry and Molecular Biophysics at Kansas State University in 4 years. Her thesis work focused on developing a method to deliver genes into cells using peptide nano-spheres. Currently, she is a Research Associate at Auburn University working in the field of drug delivery and micro-fluidics. She has helped to establish a biotechnology company, Genetadi Biotech SL, in Bilbao, Spain from 2008 to 2010 and she had been a founding partner since then. She has published 5 research papers and 1 review article. Presently, she is serving as a co-chair for the Gordon Research Seminar in Cancer Nanotechnology.

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