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Tethered antioxidants for animal health

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The targeting of drugs to specific cellular compartments is an emerging objective in animal health. Recently, there has been success in targeting drugs to the mitochondrial membrane. Mitochondria damage/dysfunction contributes to a wide range of diseases including aging, diabetes, defective apoptosis in cancer and degenerative diseases. Mitochondria damage/dysfunction also influences energy production, energy partitioning in cells/tissues and efficiency of energy use which potentially contributes to obesity as well as loss of physical strength and endurance. Reducing mitochondrial ROS generation induced by environmental factors (i.e., diet) will allow more optimal activities of aconitase, ANT1, and beta oxidation, increase/maintain ATP supply, and reduce diversion of calories to fat synthesis/accretion. While a number of peptide-based drug candidates have been reported, a small number of lipophilic triphenyl phosphonium salt-based drug candidates have also been reported. While most of the published studies are related to human health, applications to animal health are beginning to emerge. Vitamin E, BHT (di-tert-butyl hydroxy toluene) and TBHQ (tert-butyl hydroquinone) are antioxidants used widely in the animal health industry. As part of a study to enhance their effectiveness, we report the preparation of tethered analogs of Vitamin E, BHT, and TBHQ plus some preliminary animal studies.

Biography

George A. Kraus received his B.S. from the University of Rochester in 1972 his Ph.D. from Columbia University in 1976. He is presently a University Professor of Chemistry at Iowa State University. He has published more than 290 papers in peer-reviewed journals and is co-editor of the RSC Green Chemistry book series.

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