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Cellular communication: Novel endocannabinoid-like lipids, fruit flies and other insects, N-acyltransferases, and subtraction lipidomics

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Fatty acid amides are an extensive family of cell signaling lipids with the general structure of R-CO-NH-Y. This structural simplicity belies a wealth of diversity amongst this lipid family as the R-group is derived from fatty acids (R-COOH) and the Y-group is derived from a number of biogenic amines (H_2N-Y). The fatty acid amide family is divided into different classes, which are defined by parent amines. Examples include the N-acylethanolamines (NAEs, R-CO-NH-CH_2-CH_2OH), the N-acylglycines (NAGs, R-CO-NH-CH_2-COOH), and the fatty acid primary amides (PFAMs, R-CO-NH_2). In addition to the NAEs, the NAGs, and the PFAMs, other classes of fatty acid amides are known. As the best known fatty acid amide is N-arachidonoylethanolamine (anandamide), a fatty acid amide found in the human brain that binds to the cannabinoid receptors. The Merkler laboratory has had a long interest in the fatty acid amides, with a focus on their biosynthesis. We and others have demonstrated that the NAGs and the NAEs are precursors to the PFAMs and were the first to identify N-oleoylglycine from a mammalian source, long-chain N-acylserotonins from *Drosophila*, and have characterized a set of N-acyltransferases from mammals, *Drosophila melanogaster*, the silkworm (*Bombyx mori*), and the red flour beetle (*Tribolium castaneum*). The fatty acid amide field is littered with many unanswered questions, including: Have all the naturally-occurring fatty acid amides been uncovered? which enzymes are involved in fatty acid amide metabolism *in vivo*? and what are the respective contributions made by divergent pathways of fatty acid amide metabolism?

Biography

David J Merkler has completed his PhD from the Pennsylvania State University in 1985 and completed Post-doctoral studies in Dr. Vern L Schramm's group at the Albert Einstein College of Medicine. He took a position as a Senior Scientist at Unigene Laboratories, Inc., and contributed to the project on the *in vitro* production calcitonin. He has served on the Chemistry Faculty at Duquesne University and the University of South. His academic research has been supported by the National Institutes of Health and he has 75 publications in reputable journals.

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