

N-acyltransferases and their role in fatty acid amide biosynthesis

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Fatty acid amides are a family of cell signaling lipids with the general structure of R-CO-NH-Y. Its 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 biogenic amines (H₂N-Y). The fatty acid amide family is divided into classes, defined by parent amines. Examples include the N-acylethanolamines (NAEs, R-CO-NH-CH₂-CH₂OH) and the N-acylglycines (NAGs, R-CO-NH-CH₂-COOH). Other classes of fatty acid amides are known. The best known fatty acid amide is N-arachidonylethanolamine (anandamide), a fatty acid amide found in the human brain that binds to the cannabinoid receptors. We have a long interest in the enzymes of fatty acid amide biosynthesis. We identified an enzyme that oxidizes the NAGs to the primary fatty acid amides and showed that inhibiting this enzyme led to the cellular accumulation of the NAGs. We have characterized several insect N-acyltransferases (from *D. melanogaster*, *B. mori*, and