A *Drosophila* model for developmental nicotine exposure

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Tobacco addiction is an extraordinarily complex issue that kills more than 7 million individuals each year. Nicotine is the primary compound in tobacco associated with its addictive properties. Many pregnant women are exposed to nicotine. Developmental nicotine exposure has deleterious effects in development and is associated with behavioral abnormalities later in life. Although the receptors for nicotine are known, the genetic, cellular and molecular mechanisms that mediate the effects of prenatal nicotine exposure are not well understood. *Drosophila melanogaster* is a proven model organism to identify genes and novel mechanisms for drugs of abuse. Research in *Drosophila* has begun to identify genes involved in the responses to acute and chronic nicotine exposure in adult flies. My lab is developing a *Drosophila* model for developmental nicotine exposure. We have shown that developmental nicotine exposure in *Drosophila* decreases survival, increases development time, and reduces adult weight. Flies reared on nicotine food also show decreased sensitivity to acute nicotine and alcohol. The *Drosophila* nicotinic acetylcholine receptor alpha subunit 7, is required for several of the effects we characterized. Developmental nicotine exposure also affects brain size and dopamine expression. We have also conducted a genetic screen of a collection of P-element insertion mutants to identify mutants with differential sensitivity to nicotine on a survival assay and have identified several strains that are either sensitive or resistant to nicotine. We are in the process of identifying the mutated genes in these strains. Here we present a summary of the data we have collected supporting *Drosophila melanogaster* as a viable additional model organism to elucidate the mechanisms of action of nicotine during development. Next, we will investigate where in the nervous system these genes act to mediate nicotine sensitivity and will determine if these genes also mediate other effects of developmental nicotine exposure.