Comparative Physiology Lab
Independent Project
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A Drosophila Model for Developmental Nicotine Exposure

Annotated Bibliography – Proposal Stage

1. Benowitz, N. L. (2009). Pharmacology of Nicotine: Addiction, Smoking-Induced Disease, and Therapeutics. Annual Review of Pharmacology and Toxicology, 49, 57-71.

Discusses the pharmacology of nicotine, focusing on its addictive properties, mechanisms of action, and therapeutic approaches for smoking cessation. It highlights how nicotine binds to nicotinic cholinergic receptors, leading to addiction through the release of dopamine and other neurotransmitters. Genetic factors and nicotine metabolism play a role in dependence, and treatments include nicotine replacement therapies, bupropion, and varenicline.

2. Benowitz, N. L. (2010). Nicotine Addiction. New England Journal of Medicine, 362(24), 2295-2303.

In depth look at nicotine addiction, explaining the physiological and molecular mechanisms that underlie tobacco dependence. It discusses the role of nicotine in stimulating nicotinic receptors, which leads to the release of neurotransmitters and addiction. The article also addresses the challenges of smoking cessation and the public health impact of smoking-related diseases.

3. Jones, A. K., & Sattelle, D. B. (2010). Diversity of Insect Nicotinic Acetylcholine Receptor Subunits. In Insect Nicotinic Acetylcholine Receptors (pp. 1-25). Landes Bioscience.

This chapter explores the diversity of nicotinic acetylcholine receptors (nAChRs) in insects, highlighting their role in synaptic transmission and insecticide resistance. The chapter emphasizes the potential for targeting species-specific nAChR subunits in pest control while minimizing harm to beneficial species.

4. Mannett, B. T., Capt, B. C., Pearman, K., Buhlman, L. M., VandenBrooks, J. M., & Call, G. B. (2022). Nicotine Has a Therapeutic Window of Effectiveness in a Drosophila melanogaster Model of Parkinson's Disease. Parkinson's Disease, 2022, 9291077.

Investigates the effects of nicotine in a Drosophila model of Parkinson's disease, finding that nicotine administered within a specific time window improves motor function in the model. The findings suggest a potential therapeutic role for nicotine in treating early Parkinson's symptoms, but timing is crucial for effectiveness.

5. Ping, Y., & Tsunoda, S. (2011). Inactivity-induced increase in nAChRs upregulates Shal K+ channels to stabilize synaptic potentials. Nature Neuroscience, 15(1), 90-98.

Demonstrates that homeostatic mechanisms regulate synaptic potentials in Drosophila neurons. In response to inactivity, nAChR expression increases, leading to the upregulation of Shal K+ channels, which stabilize synaptic potentials and prevent over-excitation. These findings contribute to understanding how nicotine addiction may influence synaptic regulation.

6. Rimal, S., & Lee, Y. (2019). Molecular sensor of nicotine in taste of Drosophila melanogaster. Insect Biochemistry and Molecular Biology, 111, 103178.

Identifies gustatory receptors in Drosophila melanogaster that detect nicotine, revealing that certain receptors are involved in avoiding nicotine-laced foods. These findings have implications for developing targeted insecticides that exploit nicotine sensitivity in pest species.

7. Salas, R., Orr-Urtreger, A., Broide, R. S., Beaudet, A., Paylor, R., & De Biasi, M. (2003). The Nicotinic Acetylcholine Receptor Subunit α5 Mediates Short-Term Effects of Nicotine in Vivo. Molecular Pharmacology, 63(5), 1059-1066.

The role of the α5 subunit of nicotinic acetylcholine receptors in nicotine sensitivity. Using α5-deficient mice, the researchers demonstrate that this subunit influences nicotine-induced behaviors, suggesting its potential role in nicotine addiction and responses to nicotine exposure.

8. Sanchez-Díaz, I., Rosales-Bravo, F., Reyes-Taboada, J. L., Covarrubias, A. A., Narvaez-Padilla, V., & Reynaud, E. (2015). The Esg Gene Is Involved in Nicotine Sensitivity in Drosophila melanogaster. PLoS ONE, 10(7), e0133956.

Explores the genetic basis of nicotine sensitivity in Drosophila, identifying the Esg gene as a key factor. Flies with mutations in the Esg gene exhibit heightened sensitivity to nicotine, providing insights into the genetic components that influence nicotine addiction.

9. Sellier, M. J., Reeb, P., & Marion-Poll, F. (2011). Consumption of Bitter Alkaloids in Drosophila melanogaster in Multiple-Choice Test Conditions. Chemical Senses, 36(4), 323-334.

Examines how Drosophila melanogaster reacts to bitter alkaloids, including nicotine, in a multiple-choice feeding assay. The results demonstrate that flies avoid bitter substances, and the gustatory system plays a central role in these feeding decisions.

10. Velazquez-Ulloa, N. A. (2017). A Drosophila model for developmental nicotine exposure. PLoS ONE, 12(5), e0177710.

This study uses Drosophila melanogaster to model the effects of developmental nicotine exposure, finding parallels to mammalian systems. Developmental exposure leads to decreased survival, delayed development, and altered sensitivity to nicotine, shedding light on how early nicotine exposure affects neural development.