Antidepressants alter the behavior and physiology of *C. elegans*
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Depression affects 264 million people worldwide and is a pressing health crisis(1). Despite this, research regarding the physiology of depression and how egg laying rate is changed(2) is lacking. This study aims to provide insight into these mechanisms by studying the biological effects of one antidepressant, selegiline, a monoamine oxidase inhibitor (MAOI), on *C. elegans*. MAOIs prevent degradation of monoamines, such as serotonin and dopamine, by inhibiting an enzyme called monoamine oxidase(3,4). However, the mechanisms behind antidepressants is largely unknown. This study investigates how egg-laying, thrashing, and lipid composition of *C. elegans* are affected by Selegiline. These functions are modulated by homologous neurotransmitter pathways in humans and in *C. elegans* these same pathways are implicated in depression(5). This research will help to define the pathways with which MAOIs interact to treat depressive symptoms.

**Introduction**

- Synchronized adult WT worms on treated NGM plate
- Egg count per day

**Methodology**

**Egg-Laying Assay**
- Adult Egg Laying Rate Observed for Selegline Treated *C. elegans*

**Thrashing Assay**
- Thrashing recorded 30 minutes & 24 hours post selegline exposure
- Thrashing assay results indicate that selegline redistributes egg laying significantly decreased frequency of thrashes following acute exposure and normal thrashing was not regained for at least 24 hours (Fig. 2)

**Lipid Assay**
- Neutral lipid GC-MS relative analysis of lipid samples
- GC/MS relative analysis of lipid samples

**Results**

**Egg-Laying Assay**
- Treatment with selegline redistributes egg laying
- Egg laying rate and decreased thrashing indicates dysregulation of neutral lipid GC-MS data

**Thrashing Assay**
- Selegline Treatment Results in Modified Thrashing in *C. elegans*

**Lipid Assay**
- Selegline Treatment Changes % FA Composition of Phospholipid in *C. elegans*

**Future Research**
- Future Research: To better understand the molecular pathways affected by selegline...

**References**


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**Conclusions, Limitations, and Future Directions**

**Conclusions:**
1. Increased egg laying rate and decreased thrashing indicate selegline activates hermaphrodite specific motor neurons and VC motor neurons
2. Observed pattern of up/down regulation of lipids suggests possible FAT2 and FAT7 dysregulation

**Limitations:**
1. Stress and contamination seen in egg laying assay by day 5 causing worm death from over handling
2. High variability in lipid assay selegline trials compared to control trials

**Future Research:**
To better understand the molecular pathways affected by selegline...

- Utilize FAT2 and FAT7 *C. elegans* mutants
- VC circuit knockout
- Dopamine/serotonin receptor mutants