Impact of Prednisone on the Body Length, InR, and ILP2 Expression in Drosophila melanogaster

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Due to asthma, I was prescribed prednisone a lot when I was young. After my 7th grade physical, my growth showed a decrease from the 50th percentile to the 20th percentile. My doctor suggested the decrease in my growth rate may have been because of prednisone. To study this, the fruit fly (Drosophila melanogaster) was used as an animal model. I discovered that as prednisone dose increases, body length significantly decreases. In humans, insulin-like growth factor (IGF-1), can be affected by prednisone causing bone growth to decrease. Using the NCBI website, two genes found in fruit flies, ILP2 and InR, appeared to be related to IGF-1 in humans. I worked with a researcher at the Nebraska Center for Biotechnology (University of Nebraska Lincoln) to carry out qPCR to quantify changes in their expression in response to prednisone treatment. RNA was extracted from Drosophila larva exposed to a high dose of prednisone known to cause a significant decrease in body length. On the scheduled day of the RNA extraction, there were insufficient larvae in one control and two experimental Drosophila vials. RNA from pupae was extracted in these three vials. qPCR results revealed that ILP2 in pupae had a 28.1 fold decrease in mRNA quantity while in larvae was a 1.2 fold decrease. InR in pupae had a 3.3 fold decrease in mRNA quantity, while InR in larvae had a 0.5 fold decrease. Results were surprising as it was expected the larvae would be most impacted by prednisone as they were ingesting it with food. Based on these qPCR data, prednisone may be reducing body length by decreasing the expression of ILP2 and, to a lesser degree, InR. More research is needed to determine how this is occurring and if more than the ILP2 gene is being affected.

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