

# EFFECT OF SPERMIDINE SUPPLEMENTATION ON AUTOPHAGY GENES EXPRESSION IN HONEY BEE

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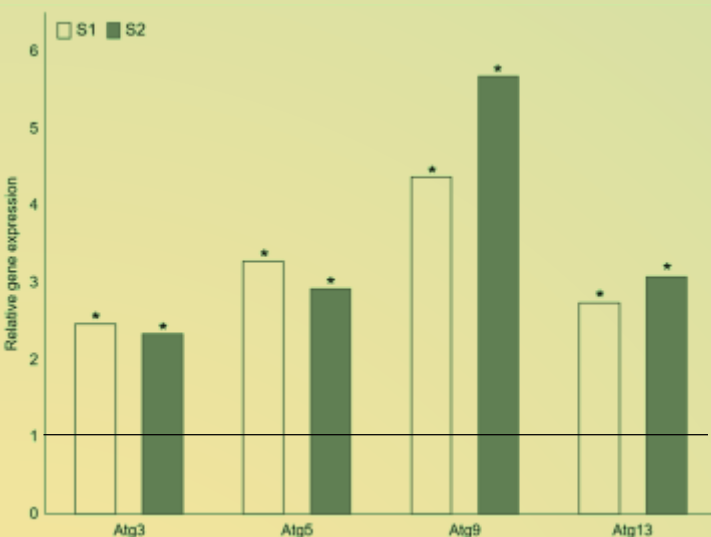
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## Introduction

Honey bee (*Apis mellifera* L.) is one of the most important pollinators in the world, however the number of colonies has been decreasing in the last few decades. Scientist revealed that major reasons of this problem are poor quality of winter feeding, pathogens, climate changes and excessive use of pesticides. Spermidine is a naturally occurring polyamine that participate in multiple biological processes. Its mechanism of action are just beginning to be understood. Exogenous supply of spermidine prolongs the life span of several model organisms, significantly reduces oxidative damages and induces autophagy. Autophagy is a cytoprotective cell mechanism by which cell recycles damaged molecules and regulate metabolism. It has been proved that loss of autophagy gene function significantly influences health and by that shortens life span

## Methods

- Honey bee collection in plastic boxes, 30 bees per box
- Three experimental groups were formed, each with three biological triplicates
- C- control- fed with 50% (w/v) sucrose solution
- S1 and S2- treatments- fed with 1 mM and 0.1 mM spermidine, respectively
- Spermidine was prepared fresh, every day, from 1 M stock
- Experiment lasted for 20 days period, after which the bees were immediately frozen and stored at -80 °C
- Three abdomens from every replicate was used for RNA isolation using RNA extracol
- cDNA was synthesized from RNA in reverse transcription reaction
- qPCR was performed using primers for specific autophagy genes: Atg3, Atg5, Atg9 and Atg13
- REST was used to analyze results



## Results

The results showed that the expression of all selected autophagy genes, Atg3, Atg5, Atg9 and Atg13, were significantly increased in both S1 (1 mM spermidine) and S2 (0.1 mM spermidine) experimental groups. Statistically significant difference compared to control (=1) is indicated with asterisk (\*)

## Conclusion

These results indicates that spermidine supplementation of honey bee diet induces autophagy and by that influences health and longevity.



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