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Bee venom, also known as apitoxin, is produced by honey bees (*Apis mellifera*) and comprises a complex mixture of substances with reported therapeutics and pharmacological properties. However, this natural product can cause severe allergic reactions, and further toxicological studies on animal models are necessary to ensure safe use. Bee venom obtained from Apis mellifera and collected in Northeast Brazil was used to investigate its effects in normal and breast cancer cells and the nematode *Caenorhabditis elegans.* In the present study, we employed the acute exposure assay system of *C. elegans* to evaluate bee venom›s toxicity *in vivo*. Synchronized L4 larval stage worms (N2-Bristol) were exposed for three hours in M9 buffer to bee venom. Behavioral parameters, including reproduction, survival, DAF-16 transcription factor location (zIs356 [daf-16p::daf-16a/b::GFP + rol-6(su1006)]), and superoxide dismutase-3 (SOD-3; muIs84 [(pAD76) sod-3p::GFP + rol-6(su1006)]) expression, were analyzed. Bee venom cytotoxic impacts on MDA-MB-231 and J774 A.1 cells were evaluated by the MTT assay until 72 hours of exposure. Acute exposure to bee venom resulted in a decrease in *C. elegans* survival, feeding behavior ($p<0.0001$), movement ($p<0.0001$) while induced an increase in the gaps between the cycles of defecation ($p<0.001$). Bee venom has also decreased nematode reproduction by reducing both egg-production ($p<0.0001$) and egg-laying ($p<0.05$). This toxin enhanced DAF-16 translocation from the cytoplasm to the nucleus, which did not affect the SOD-3 expression. Bee venom significantly inhibited the proliferation of MDA-MB-231 cells and caused a cytotoxic effect on macrophages. Our results show that exposure to bee venom produced significant toxic effects on the cells and animal model studied. *C. elegans* can provide information about the molecular and cellular mechanisms of bee venom toxicity and serve as a model organism to study the toxic effects of this natural product on human health.

1222A Deciphering the molecular mechanisms underlying the anthelmintic effect of essential oils evaluated in *Caenorhabditis elegans*

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Helminths consist of a diverse group of parasitic worms including nematodes, which cause diseases of major socio-economic importance globally. Control of infections in both human and veterinary medicine currently relies mainly on chemotherapy, but acquisition of resistance is an increasing problem, so there is an urgent need for discovery of novel drugs. As parasitic nematodes are not ideal laboratory animals, *C. elegans* has demonstrated to be a model system for the discovery of new anthelmintics and for characterizing their mechanisms of action and resistance. Essential oils (EOs) are natural products produced by aromatic plants. We here perform paralysis assays of wild-type and mutant *C. elegans* strain to identify EOs with potential anthelmintic activities, reveal the active components, their target sites and mechanisms of action. We found that EOs belonging to different orders produced rapid paralysis of *C. elegans* showing EC50 values between 0.02-2 % of EOs. All EOs tested also inhibited egg hatching, a property related to anthelmintic ability. Thus, EOs mediate both rapid and long-term anthelmintic effects. Terpenoids are terpenes with added oxygen molecules, thymol and carvacrol are the most common and well-known terpenoids present in EOs. Phenylpropenes, such as eugenol and trans-cinnamaldehyde (TC), are named as such because they contain a six-carbon aromatic phenol group and a three-carbon propene tail from cinnamic acid. We determined that TC, produces both paralysis and egg-hatching inhibition. By testing mutant worms, we identified the muscle L-AChR and GABA receptors as EOs and TC targets. Thus, by modulating two receptors with key roles in worm motility, these EOs emerge as novel sources of anthelmintic compounds. To unequivocally confirm that these receptors are targets of TC and to describe the mechanism by which they affect these receptors, we performed whole-cell and single-channel recordings from L1 *C. elegans* muscle cells. Electrophysiological recordings revealed that thymol, eugenol and carvacrol are not capable of eliciting macroscopic currents but they significantly reduce ACh- and GABA-elicited responses. At the single-channel level, we found that the activity of L-AChRs is significantly reduced in the presence of different terpenoids or phenylpropenes, without changes in channel properties. The results are compatible with the action of these drugs as allosteric inhibitors. Current studies are being carried out to determine if TC shows a similar action and to determine structure-activity relationships of the active compounds. It is hoped that this work can update the recent progress on natural nematicide discoveries and provide new ideas for the design and mechanism of action studies of anthelmintics. In addition, our study increases our knowledge related to the molecular function and pharmacology of the two main receptors involved in *C. elegans* locomotion.

1223B Worm Developmental Dynamics Database 2 – an open database with visualization for biological dynamics of large-scale RNAi experiments on *C. elegans* embryos

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