



NEUROSCIENCE RESEARCH: *Caenorhabditis elegans* AS AN ALTERNATIVE

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INTRODUCTION

There are some advantages and limitations of working with invertebrate model organisms in neuroscience (MURTHY; RAM, 2015). The most important advantage of working with this kind of model is the large diameter of neurons, moreover, glia and muscle cells facilitates microelectrode recordings, the simplicity of the neuro-system which are very small and/or compact compared with vertebrates. These organisms have well-known behaviors, which lend themselves to physiological and genetic dissection (MILLER *et al.*, 2005).

On the other hand, some important invertebrates that are used to develop research such as *C. elegans*, have their whole genome code sequenced (LEE *et al.*, 2003). These characteristics are very important when an animal model is selected (BURNE *et al.*, 2011). When an animal model like *C. elegans* is used in research it can be an outstanding alternative because the results can be easily replicated through the world. As we know, reliable results are those that can be compared or repeated.

It is important to understand that there are two main purposes which can be attended for animal models in clinical neuroscience research (HAGSTROM *et al.*, 2015). One of the goals is to simulate the mechanisms of the models, which we are going to use, and then, finding out these mechanisms through research. (BURNE *et al.*, 2011). Secondly, it is to screen for potential effects of treatments or understand how animals sense, interpret and respond to the world around them and to internal cues (BACHÈRE, 2003). It is important to keep in mind that all animal models have some kind of limitation because of differences

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between species. For instance, invertebrate model and humans have many issues to explore and to compare, we need to understand the components of their anatomic and physiological structures (BURNE *et al.*, 2011; GRÜNEWALD, 2012; SENGUPTA; SAMUEL, 2009). The goal of this paper is to provide a compact overview of an invertebrate animal model (*Caenorhabditis elegans*) showing its advantages and limitations to neuroscience research.

METODOLOGY

This article arises from a bibliography analysis and its intention is informing key features in usage of *Caenorhabditis elegans* in the current scenario of neuroscience. In addition, this paper is seeking to intensify the use of alternative invertebrates models besides the use of vertebrate animals.

RESULTS AND DISCUSSION

The main research question that was addressed by Miller, 2005 is about the step reaction of *C. elegans* chemotaxis mechanism and the stepwise temporal changes in the presence of an attractant substrate concentration. The main conclusions arising from this study exposed that *C. elegans*' chemotaxis are complexes, with many stages and a nonlinear requirement on the sign and amplitude of the stimulus. The organism chosen in this research was *C. elegans*; Invertebrates models are important because they can be used in many research such as genetic, biochemistry, physiology, etc. This study finds to explore the effects of chemotaxis mechanism in *C. elegans*, thus, the model used in this research found to construct validity.

As we know, *C. elegans* is an organism profoundly studied in some parts of the world; also, this organism has its whole genome sequenced. Consequently, utilization this organism as model is possible to measure and compare technical results. Another important advantage using it in the study is the possibility of apply the new discoveries in other research (e.g. this research explored the effects of chemotaxis mechanism, another research could compare the effects of any drugs in the chemotaxis). Also, *C. Elegans* has a Simple nervous systems with few nervous systems with a small number of neurons enhancing the tractability of neuronal circuitry, it is very important because it makes the analyses processes simpler to comprehend the interactions and/or amplify tests (BURNE *et al.*, 2011).



From another perspective, do not exist a perfect model that can be described as “the best”, only better than. A model organism need to be most possible similar with the treated issue (disease or organism-target), however, the utilized specimens might be inconstant between themselves. I be certain of that when a research has analogous targets used in the “*Step-Response Analysis of Chemotaxis in Caenorhabditis elegans*” it will be precursor of many other kinds of studies. This research has a strong scientific value because it finds to make a profound analyses in which explores important characteristics of an useable model organism. From this view, this kind of research makes an important investigation of chemotaxis that will allow application of new drugs or how it will work in different animals.

Essentially is necessary to evidence neuroscience as a science that objectives to understand how animals sense, although this knowledge is possible to interpret and reply to the world around them and to internal cues. To explore these issues, is important to interpret some important aspects that are used to comprehend researches that were used in the invertebrate model.

CONCLUSION

From this perspective, we need to comprehend the component parts of the nervous system for instance, neural circuits, cells, neurotransmitters, proteins, genes, it is deeply important to make comparisons between animal models. Secondly, the understanding about how these components interact to generate information processing dimensions for example, sensitivity, attention, learning, memory. Finally, individual characters need to be considerate such as specific ecological niches, and interact within groups of animals for example, rearing, social behavior. It is important to highlight the considerations about ours interpretation of neurobehavior and its influence in the natural environment.

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