Muscular disease research advanced with flies and mice

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Drosophila's short life span enables the Indian researchers to gain more insight, quickly, and pass this on to WA researchers who use the information for mice models. Credit: Marcello Concelo

Indian researchers using flies (Drosophila) and West Australian researchers using mice to study neuromuscular disease are part of an exciting collaboration improving research into muscular diseases and ageing.

WA scientist Miranda Grounds co-authored the recently published report looking at the limb muscles of mice and indirect flight muscles of flies.

It concluded that experimental models between mice and flies provide powerful tools for understanding factors controlling growth, maintenance, degeneration and regeneration of normal and diseased muscle.

Professor Grounds explains that at an estimated cost of $500 per mouse, research using mammals is expensive and comparatively slow because of the ethics process and the time it takes to age the animal.

"I am interested in ageing, so I have to get a mouse and leave it for two years until it is old—flies are old within 50 days," she says.

"There are a lot of advantages of working with flies—they are incredibly cheap, you don't have the ethics issue you do with mammals, they have a very quick breeding system and my colleagues can do a manipulation in them in an afternoon, whereas it can take me a year to generate a transgenic mouse."

She says it has applications to her research into muscle degeneration in ageing humans. Her observations of very old mice are that nerves let go of muscles reducing their mass and muscle function.

"So we want to know why this is happening in mice. We've done a lot of work looking at genes and we can ask our colleague in India to knock-out a particular gene to see what happens," she says.

"This would take years using mice by the time we got funding and did the research, compared to a month using flies.

"Similarly, because of the speed they work with flies, they can suggest we go and look at a particular gene which is really interesting in their ageing flies and we then use tissue excised from our ageing mice and see if it has the same interesting change."

"While flies are not equivalent to mammalian we all know there are a lot of similarities and so they can be a very, very quick way of checking proof of principals," Prof Grounds says.

Prof Grounds is part of the Indian Ocean Rim Muscle Colloquium which meets regularly to share research in the field and which she says is a powerful tool for the exchange of information and ideas.

More information: "Skeletal muscle degeneration and regeneration in mice and flies." Rai M, et al. *Curr Top Dev Biol*. 2014;108:247-81. DOI: 10.1016/B978-0-12-391498-9.00007-3.

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