Research team helping better understand causes of muscular dystrophy

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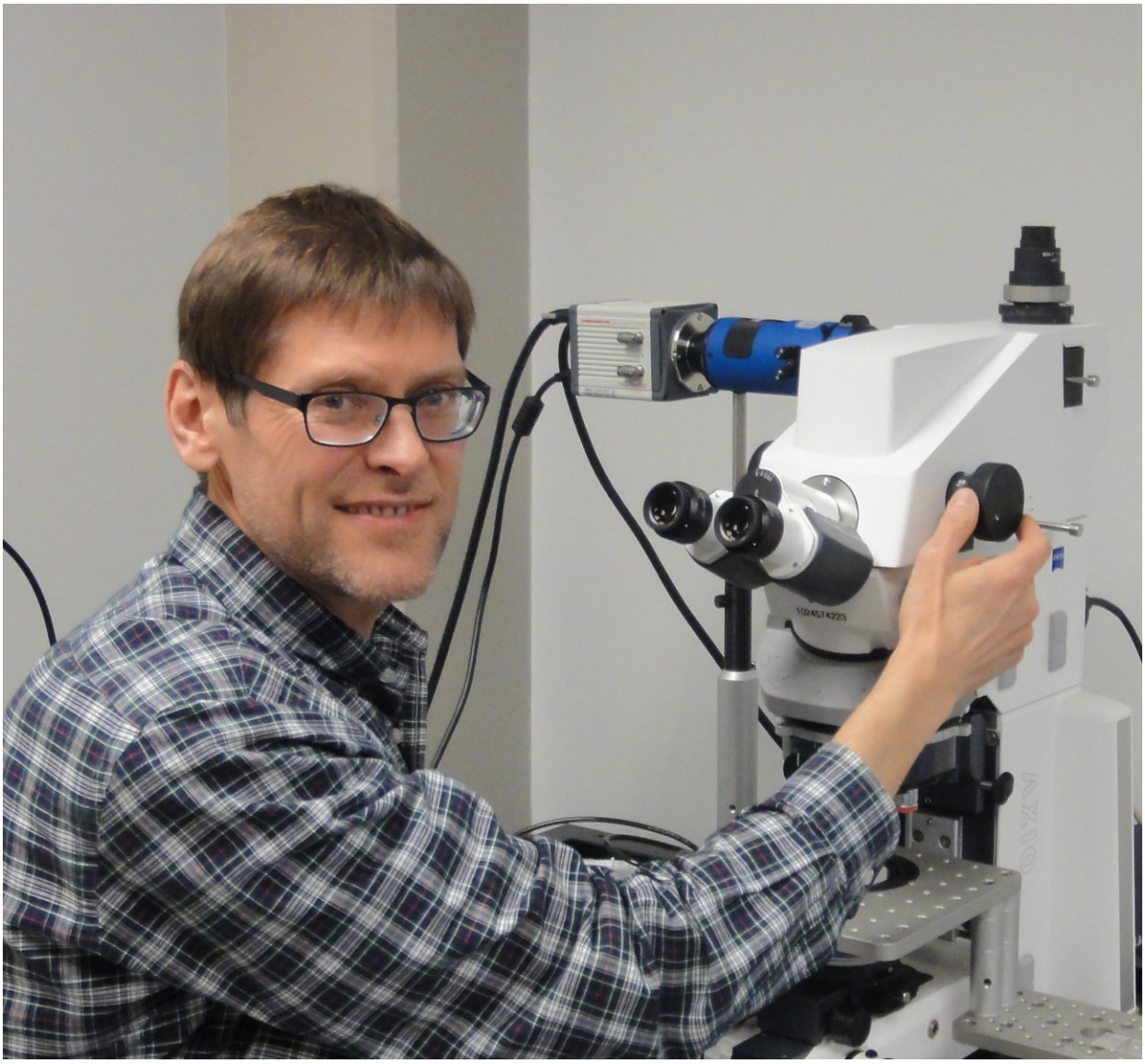

Dr. Vlad Panin, a professor in the department of biochemistry and biophysics at

Texas A&M University in College Station. Credit: Texas A&M AgriLife photo

Using fruit flies, Texas A&M AgriLife Research scientists may be one step closer to better understanding the pathological mechanisms of muscular dystrophy.

The researchers say they hope their work could assist medical doctors in prescribing effective therapies in the future. According to Dr. Vlad Panin, a professor in the department of biochemistry and biophysics at Texas A&M University in College Station, fruit flies were used in laboratory research to understand how certain aspects of muscular dystrophy develop.

"Fruit flies are very much like humans in how their genes, cells and organs function during development in adult life and aging," Panin said. "We work with fruit flies to get a better understanding of how human glycosylated proteins work since their functions are similar in flies."

Joining Panin in the research were his laboratory colleagues: graduate students Ryan Baker, Ishita Chandel, Brooke Howell and Dmitry Lyalin, along with Dr. Naosuke Nakamura who came from Japan to work on the project. They chose fruit flies because flies and humans use many of the same genes, but the genetic makeup of flies is much simpler and the short life cycle of flies better assists scientists in conducting genetic experiments, Panin said.

The focus of the work has centered on Protein O-mannosyltransferase, also known as POMT, an enzyme that modifies properties of many other proteins, which is essential for normal function of muscles and the nervous system. Mutations in POMT genes are known to cause severe muscular dystrophies and neurological abnormalities. How POMT genes

affect muscles and the nervous system is not well understood. Currently, there is no cure for the debilitating diseases caused by defects in these genes. To uncover POMT functions, the researchers investigated fruit flies with POMT mutations.

Panin said the research team found that fly embryos use special muscle contractions to move inside the egg, which is thought to help their muscles and neurons develop and establish normal communication. The researchers found these muscle contractions are abnormal in POMT mutants because their neurons do not make proper connections in the nervous system.

The research, published recently in the *Journal of Neuroscience*, suggests POMT proteins are required for normal connectivity of sensory neurons to control coordinated muscle contractions and body posture. Intriguingly, abnormal muscle contractions are also observed in muscular dystrophy patients and they were previously reported in zebrafish embryos with a related genetic defect, Panin said.

"Our findings shed light on a novel link between muscle and neural abnormalities in POMT mutant fruit flies, which may help understand similar pathogenic mechanisms in mammals and reveal causes of neurological defects in muscular dystrophies," Panin said. "We don't fully yet understand these mechanisms. But we certainly hope that our work will guide future medical studies and will help eventually develop effective therapies for patients with these debilitating diseases."

More information: Ryan Baker et al. Protein O-Mannosyltransferases Affect Sensory Axon Wiring and Dynamic Chirality of Body Posture in theDrosophilaEmbryo, *The Journal of Neuroscience* (2017). DOI: 10.1523/JNEUROSCI.0346-17.2017

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