Gene doping of mice to produce fitness

Introduction

Seeing as gene therapy is a powerful yet largely unexplored frontier in medicine, it may be a useful technique for other purposes. The phenomenon of exercise is a complex biochemical process that so far no one has been able to recreate the effects of. Perhaps gene therapy can be used in lieu of working out at the gym for sedentary people and casual athletes who do not have the time. Much of the effect of exercise on a cellular level is manifested in the mitochondria. PGC1a, a protein coded for by mitochondrial DNA, indicates to mitochondria that they should multiply while curbing oxidative stress (Handschin & Spiegelman). Expression of this protein may be responsible for enough of the state of fitness resulting from exercise that its expression alone may give an organism athletic ability resembling that of a fitter specimen that exercises more (Handschin & Spiegelman). We may be living in a world where exercise is actually a waste of time.

Experiment

60 mice will be injected with the PCR-synthesized DNA sequence of PGC1a (Wang & Szaro). 40 will be made to exercise every other day on motorized treadmills. 20 will serve as controls. Visually apparent features such as muscle growth will be recorded of all groups as the second group of mice is put to exercise each day. On day 80, all the mice will be run to exhaustion and the times this takes will be recorded. On this day all animals will be sacrificed and samples of muscle tissue from each group will be examined by microscopy.

Discussion

If PGC1a expression is all it takes to become fit, we will be faced with a problem much easier to solve than to work out regularly. Maybe some institutions that give out grants will catch word of my experiment and research with genes will begin to branch out of health applications.

PCR may not be the best technique since it has been shown to cause a low rate of expression of the gene. I picked it because it sounded like an elegant experiment but there may be a better method for this purpose. Mice may exhibit fitness differently than humans. PGC1a might only be one component of the genetic cocktail that would make mice run as if they were more athletic.

References

Handschin, Christoph, and Bruce Spiegelman. "The Role of Exercise and PGC1alpha in Inflammation and Chronic Disease." *Nature* (2008): n. pag. Web.

Wang, Chen, and Ben Szaro. "A Method for Using Direct Injection of Plasmid DNA to Study Cis-regulatory Element Activity in F0Xenopus Embryos and Tadpoles." *Developmental Biology* (2014): n. pag. Web. 25 Nov. 2014.