Genetics used to identify the cause of a neuromuscular disease in cats.

Diseases affecting muscles often cause problems with movement, eating, grasping and shaking. Many muscle problems are caused by alterations in the DNA. Since cats and humans have very similar DNA and genes, perhaps cats and humans could have the exact same muscle disease caused by similar DNA changes. Subsequently, maybe the same drugs and treatments can be used between the two species to help alleviate the health effects. A Maine Coon cat with an unknown muscular problem was identified and veterinarians predicted the cause to be genetics, not caused by poor diet, toxins, or trauma. The objective was to find a cause for the muscular problem by studying the cat's genes. DNA was isolated from a 3 ml whole blood sample. The DNA was submitted to the MU DNA Core facility for production of the sequence of all the cat's genes and chromosomes. The sequence of the Maine Coon cat was compared to the sequences of 339 cats without the muscle problem. The Maine Coon cat had two copies of a DNA mutation in the gene *myotubularin*, (*MTM1*), which causes a similar muscle problem in humans. The associated muscle disease is called centronuclear myopathy. Eleven other Maine Coon cats, including 8 males and 3 females, were DNA tested for the same DNA problem using targeted DNA sequencing and none of the cats had the alternation. Thus, the DNA alteration is private to the cat affected with the muscle disease and not a DNA alteration common to Maine Coon cats. Therefore, the DNA change is a highly likely cause for the muscle problem in the Maine Coon cat and the treatments used in the human disease could be applied to the cat. This technique of exploring the entire DNA sequence to find causes for health problems is termed "Precision Medicine".