Myostatin and the Nervous System

In our increasingly elderly society, slowing and reversing muscle wasting and loss of strength is an urgent healthcare problem. Muscle loss and weakness are significant contributing factors to falls, fractures, loss of independence and an overall reduced quality of life in the elderly. In 1997, the discovery of Myostatin (MSTN), a negative regulator of muscle growth, opened an attractive possibility for new therapies, namely the development of MSTN inhibitors that could induce muscle hypertrophy. In these 20 years, a vast body of work has documented changes in MSTN expression levels following muscle-related manipulations, and vice versa, changes in muscle architecture resulting from manipulations in the expression of MSTN and related molecules. However, few of these studies have addressed the impact that MSTN manipulations exert on the nervous system, and none have investigated the consequences of long-term deletion of MSTN in aging. We have developed a new animal model in which the myostatin gene can be knocked-out in adulthood with doxycycline (the Conditional Myostatin Knock Out, or CMKO). We have published the results of the first study, describing a sexual dimorphism in MSTN effects in a young group of CMKO, and we are now performing the first neurophysiological and behavioral study of MSTN deletion in aging.

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Dr. Sonsoles de Lacalle, Associate Professor in the Department of Biomedical Sciences at Ohio University Heritage College of Osteopathic Medicine, received her M.D./Ph.D. in 1990 from the University of Navarra, Spain. Between 1990-1992 she trained as a Fulbright Scholar with Prof. Clif B. Saper in the Department of Pharmacological and Physiological Sciences at the University of Chicago. After completing her postdoctoral training, Dr. de Lacalle was an Instructor (1992-1996) and Assistant Professor (1996-1999) in Neurology at Harvard Medical School and a Staff Scientist in the Department of Neurology at Beth Israel/Deaconess Medical Center. After 5 years at California State University Los Angeles, where she received tenure, Dr. de Lacalle became the founding chair of the Department of Biomedical Sciences at Charles Drew University (Los Angeles). In the summer of 2012 Dr. de Lacalle moved to Ohio University, where she directs the Office for Advanced Studies in the Heritage College of Osteopathic Medicine and the Doctoral Program in Translational Biomedical Sciences.