

Myoprotective Role of Premarin in Spinal Cord Injury – Dr. Ken Nozaki

- Our first goal is to see whether any molecular changes occur in the sublesional skeletal muscle after SCI in its acute phase. We first induced moderately severe SCI (40g cm) at the T10 level of the spinal cord (injury group), or laminectomy only (sham group) in adult male Sprague-Dawley rats (weight 250-300g). We sacrificed the animals 48 hrs after the induction and separated medial gastrocnemius muscles. We saw visibly red and white parts in each muscle sample. To see whether there was any difference between them, we obtained protein samples from each part and measured expression levels of myofibrillar proteins (myosin heavy chain-1, and -2b). Both proteins were expressed higher in red compared to white part. The data suggest higher muscle protein content in red part, and thus we carried following studies using muscle samples obtained from visibly red part.
- We examined the expression levels of various proteins and compared between injury and sham groups. Expression levels of Akt and phospho-Akt (protein synthesis markers) were decreased in the injury group compared to the sham group. Expression levels of MuRF-1 and MAFbx (protein degradation markers), and Cox-2 and TNF- α (inflammatory markers) were increased in the injury group compared to the sham. These data indicate that decreased protein synthesis, increased protein degradation, and inflammation occur in sublesional muscles after spinal cord injury in its acute phase. These findings are important since they occur earlier than previously reported, and in the stage when significant muscle atrophy is usually not seen. Our data also suggest that inflammatory changes may trigger other molecular changes.
- Our next goal is to see whether other molecular changes occur in the subacute phase. We will induce injury and sham, sacrifice animals in 2wk, and compare protein expression levels of proteases and mitochondrial related proteins between the two groups. Based on these data, we will determine appropriate timing and dosage of estrogen, and see its myoprotective role in SCI.