

Mitochondrial fission with Function Impairment in Burn Serum Treated C2C12 Cells

Alvand Sehat, Juquan Song, Puneet Kumar, Anthony Cai,
Ryan M. Huebinger, Deborah L. Carlson, Qun S. Zang, Steven E. Wolf



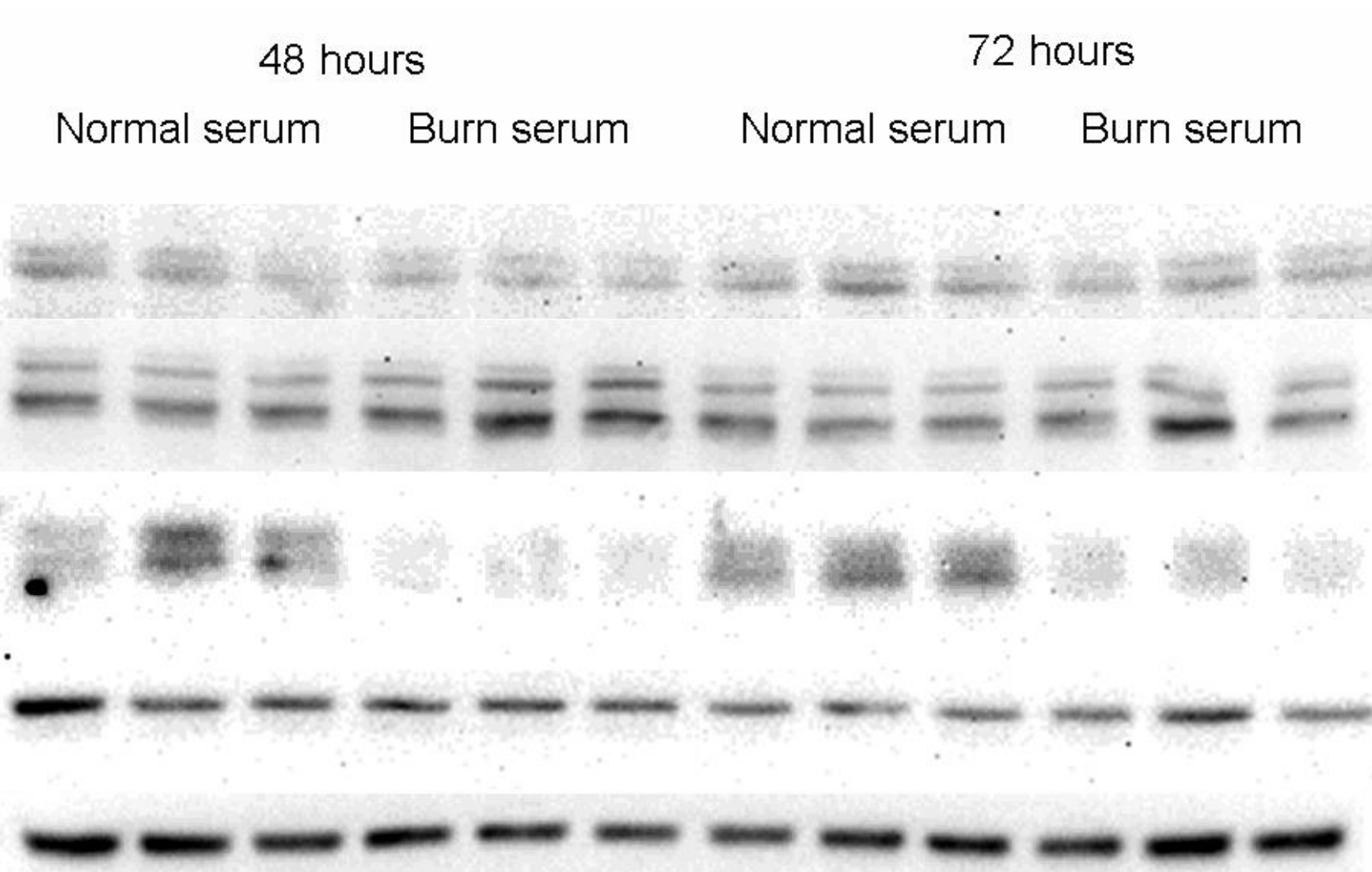
BACKGROUND

- Normal mitochondria have a fission and fusion dynamic cycle to maintain its function.
- Mitochondria fission is associated with cell death by releasing cytochrome C activated caspase cascade.
- Burn patients suffer muscle mass loss associated with increased muscle cell death.
- Mitochondria function impairment associated with muscle mass loss has been observed in severe burn patients.
- We hypothesize that severe burn impaired muscle atrophy is associated with increased mitochondria fission with function impairment.

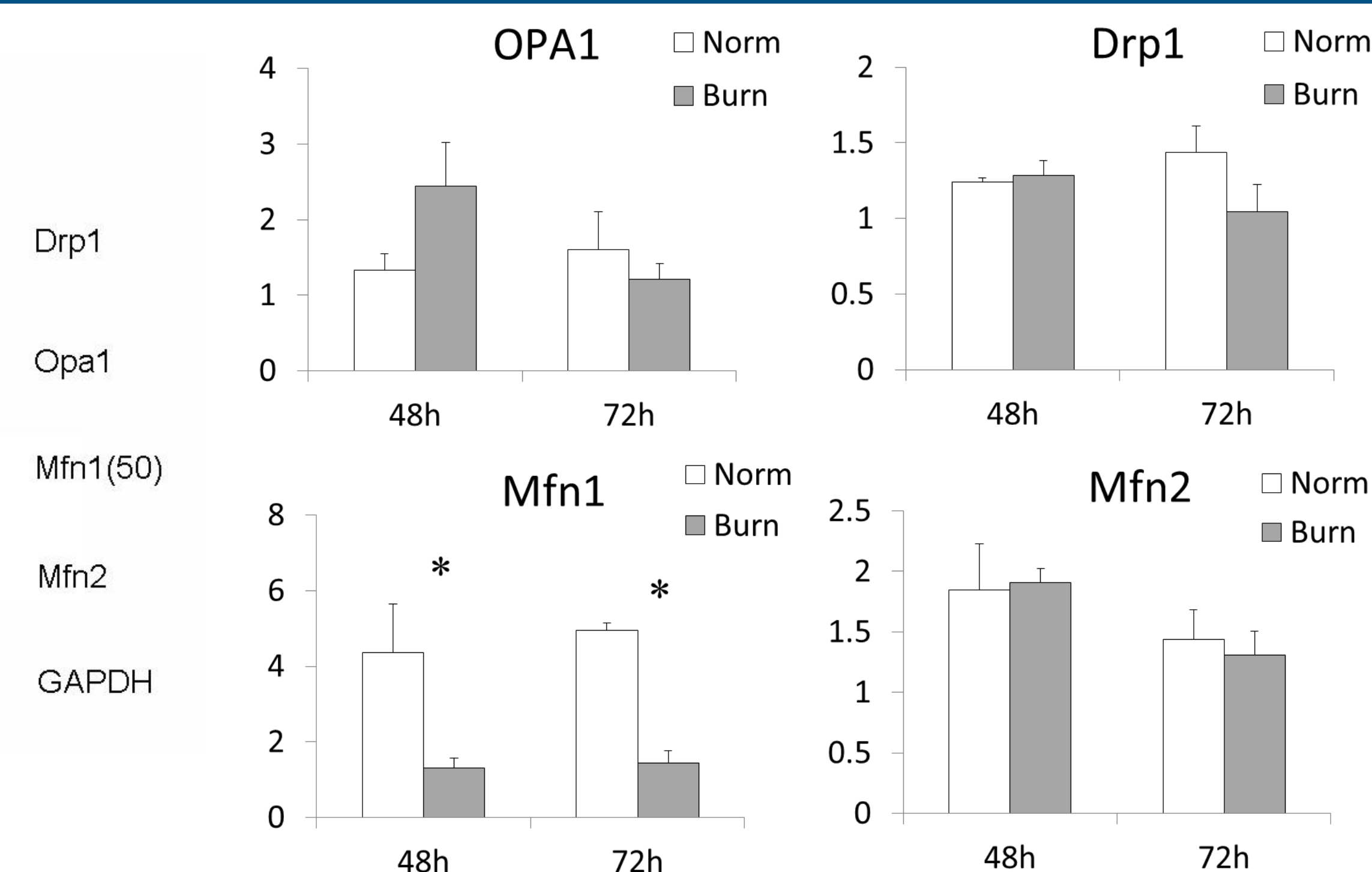
METHODS

- Murine myoblast C2C12 cells were treated with DMEM media containing 10% rat serum isolated either from 40% TBSA scald burn rats, or control rats for 3 days.
- The cells were stained with MitoTracker Green FM dye and live cell images were taken under a Nikon Ti Eclipse Confocal microscope. Mitochondrial function was evaluated with Enzo Mito-ID membrane potential cytotoxicity kit.
- Cell lysate was collected, and western blotting for fission/fusion proteins, and caspase 3 activity was measured.

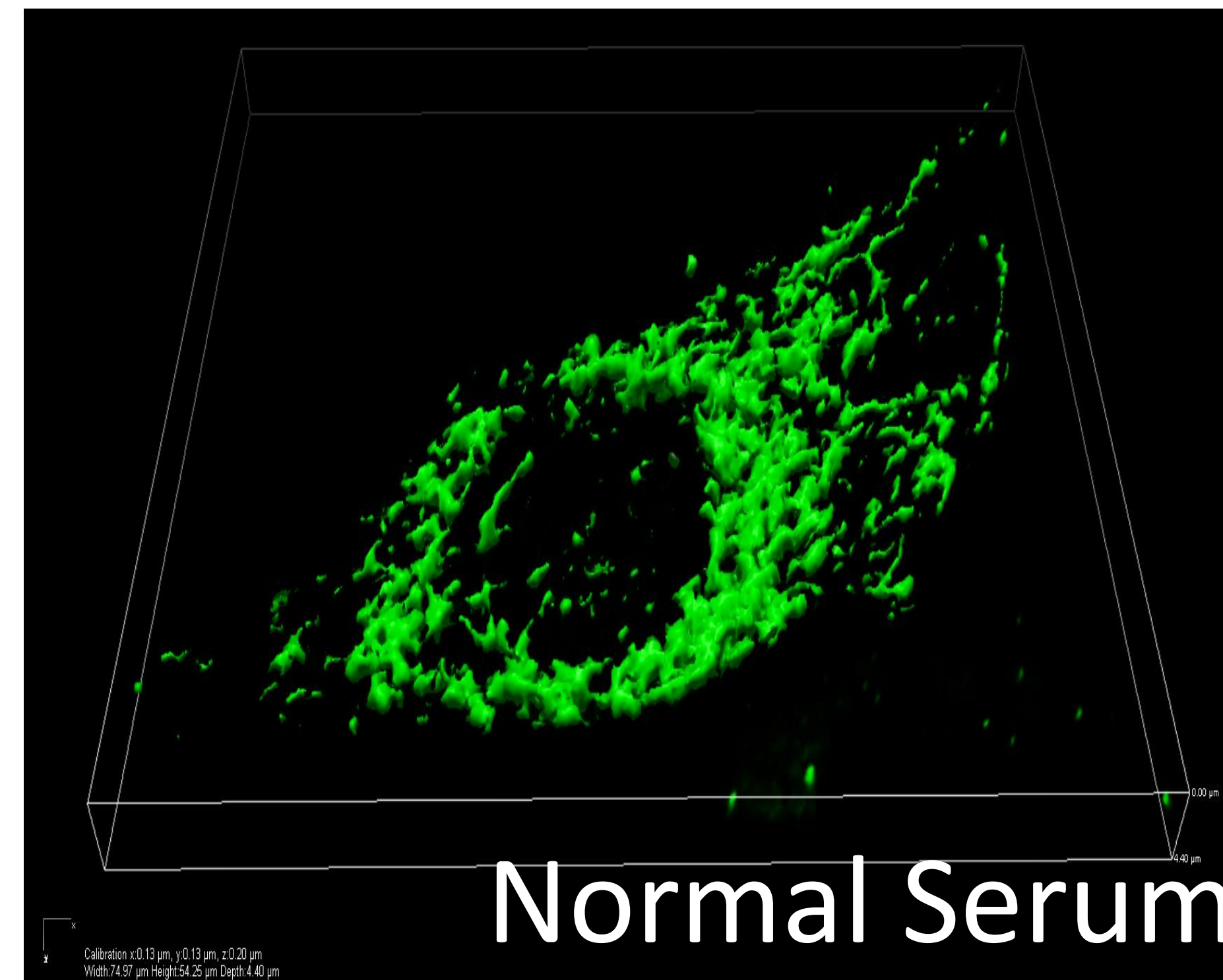
• RESULTS #2: WESTERN BLOT DETECTION OF MITOCHONDRIAL FISSION/FUSION PROTEINS EXPRESSION IN C2C12 CELLS



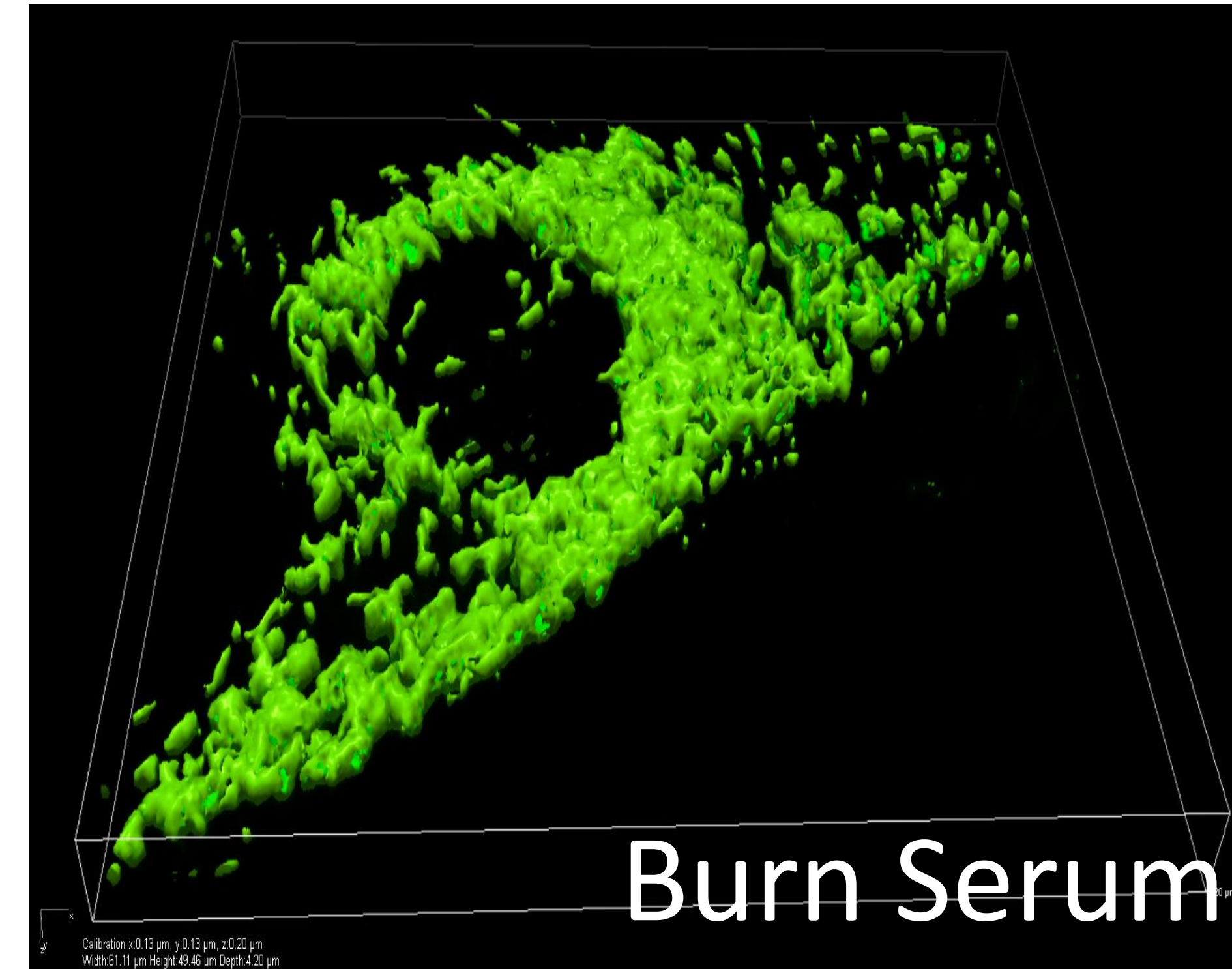
* p<0.05, norm vs. burn



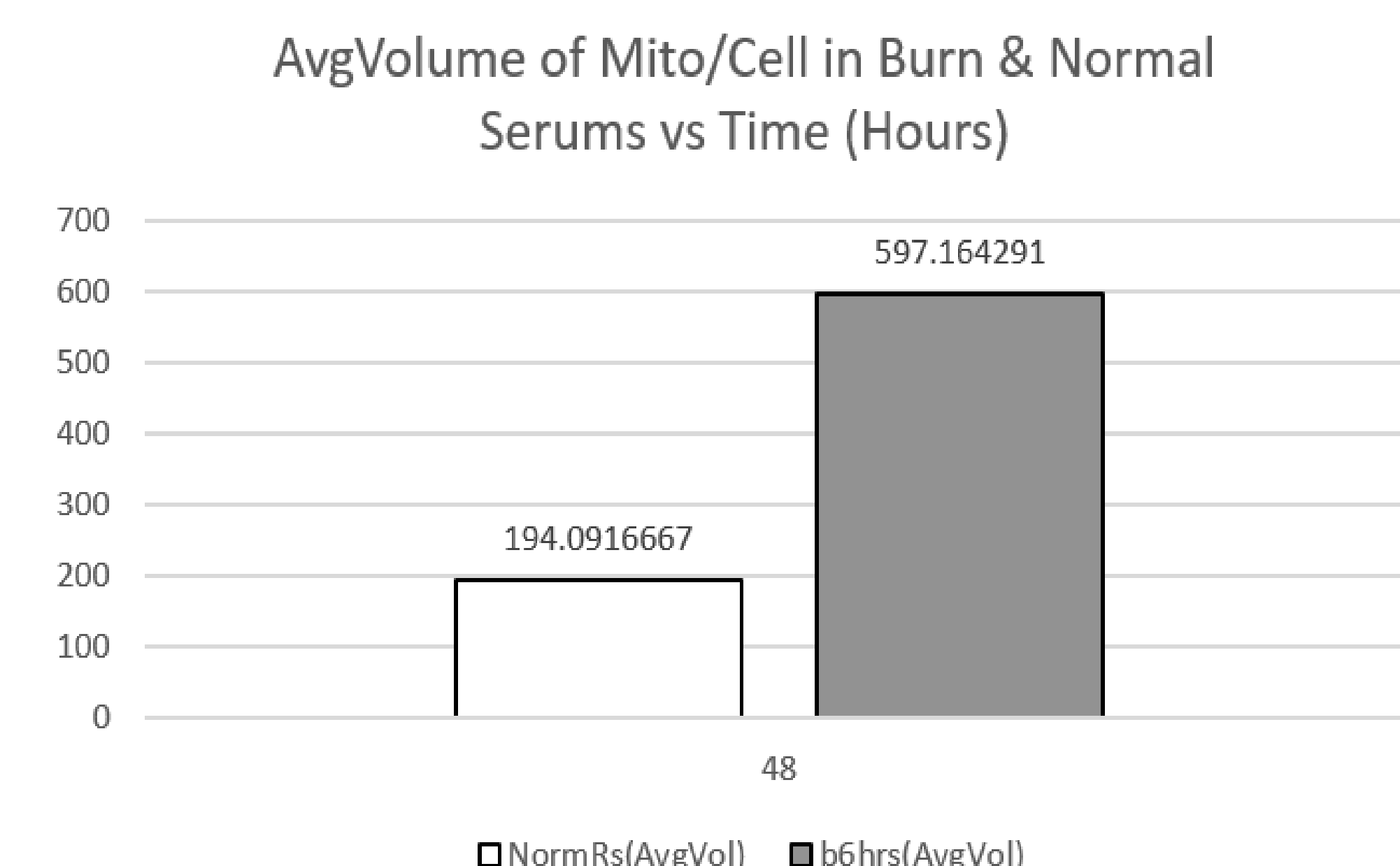
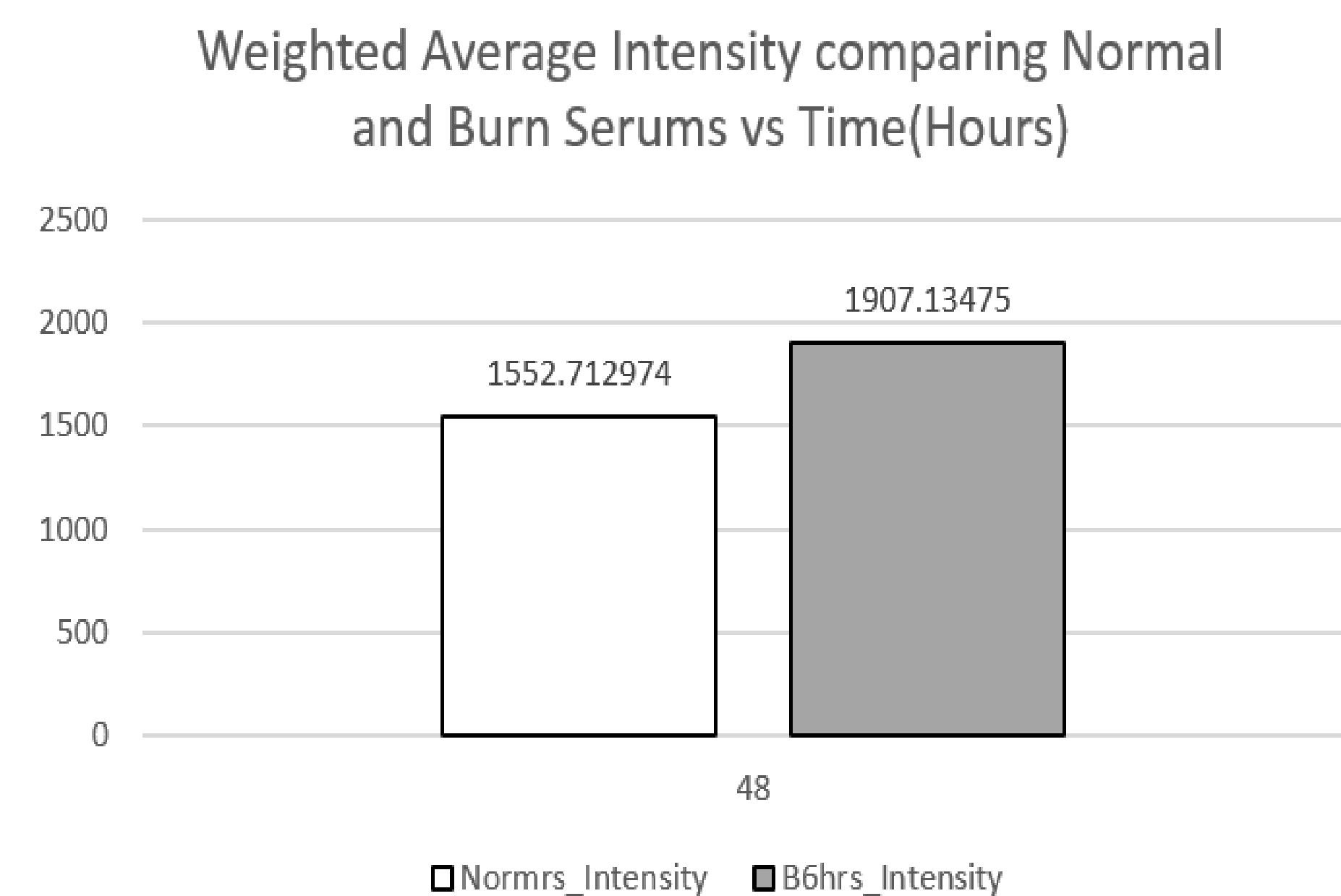
• RESULTS #1: THE INTENSITY AND VOLUME OF STAINED CELL MITOCHONDRIA WITH NORMAL AND BURN SERUM TREATMENT



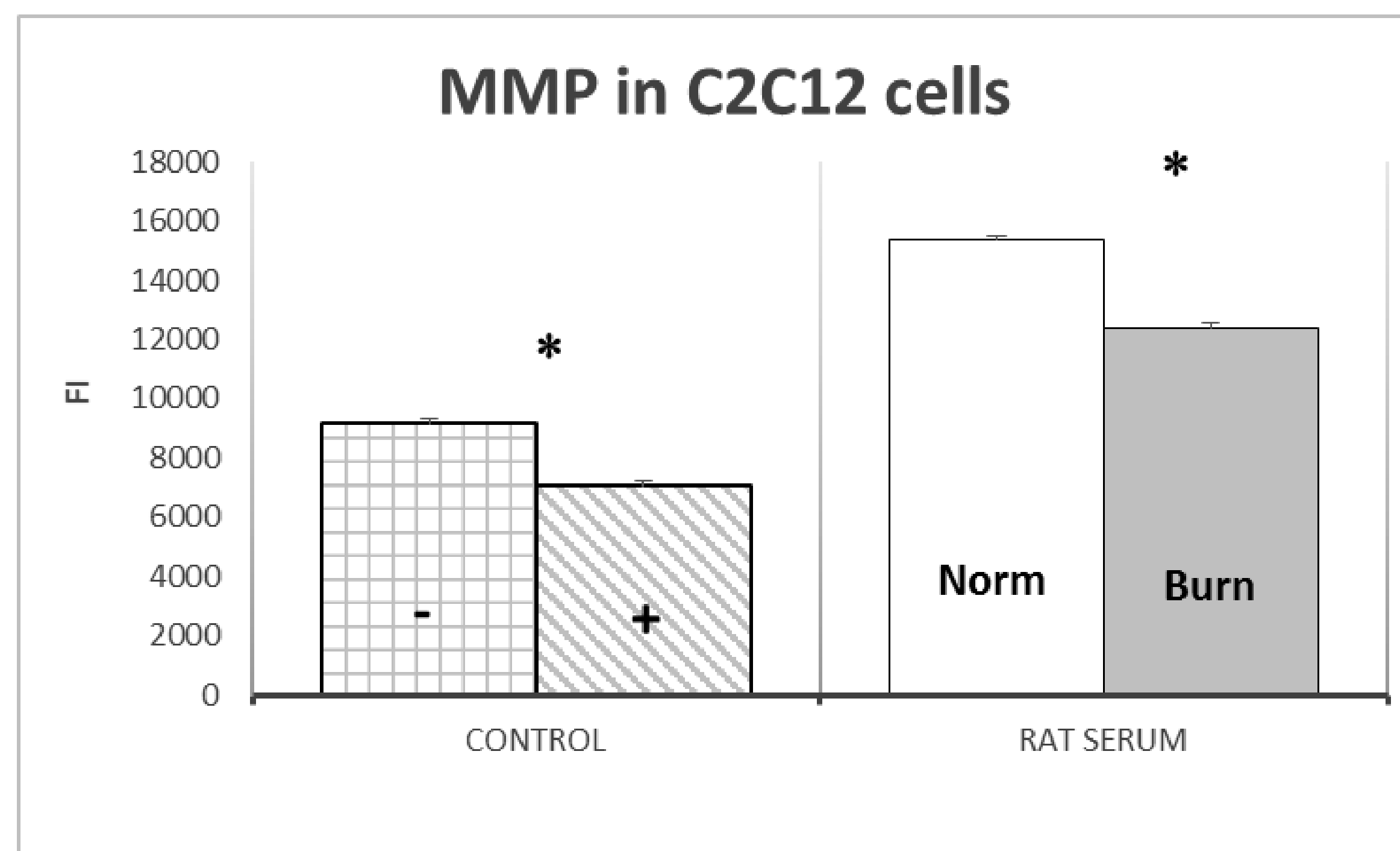
Normal Serum



Burn Serum



• RESULTS #3: MITOCHONDRIAL MEMBRANE POTENTIAL IN RESPONSE TO RAT SERUM



CONCLUSION

- Mitochondria fission/fusion ratio increased in C2C12 cells stimulated with burn serum isolated 6 hours after burn.
- Mfn1, a fusion protein, decreased and confirmed the observation of mitochondrial fission in response to burn serum.
- Mitochondrial function impaired with dropped MMP level in muscle cells in response to burn serum stimulation.
- Muscle cell death increased with elevated caspase 3 activity in burn serum stimulated C2C12 cells.
- Continued work is needed to specify the effect of the burn serum and uncover target signals to the decreased mitochondrial function.

REFERENCE

- Gao AW, Canto C, Houtkooper RH. Mitochondrial response to nutrient availability and its role in metabolic disease. EMBO Mol Med. 2014;6(5):580–9.
- Porter C, Herndon DN, Sidossis LS, Børsheim E. (2013) The impact of severe burns on skeletal muscle mitochondrial function. Burns, 39: 1039–47.

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• RESULTS #4: CASPASE 3 ACTIVITY IN C2C12 CELLS WITH RAT SERUM STIMULATION FOR 48 HOURS

