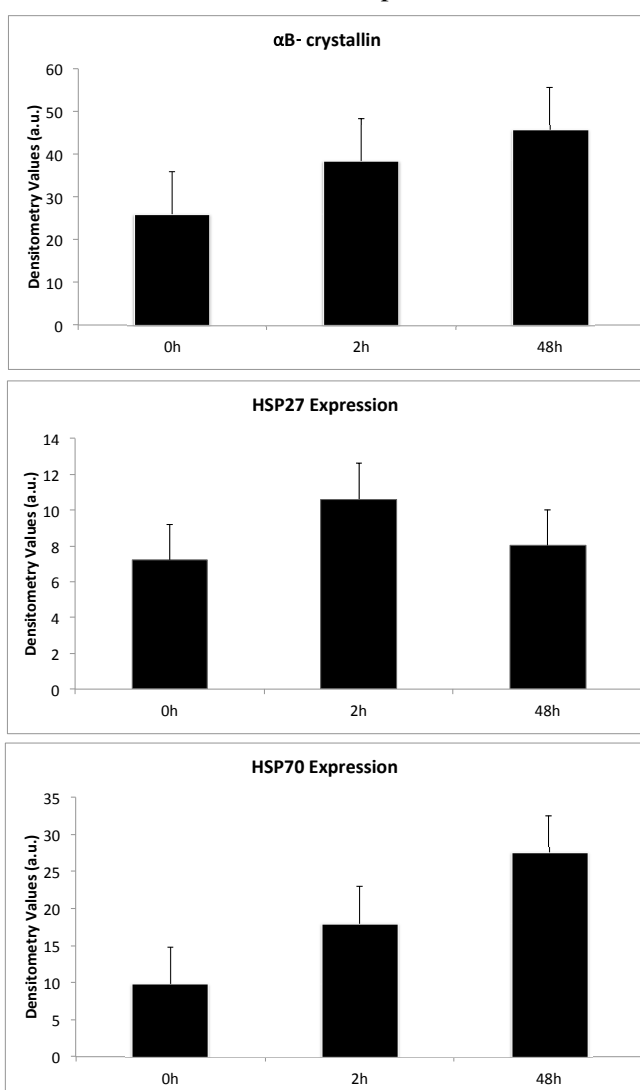


Heat therapy effects on skeletal muscle heat shock proteins in the elderly

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Sarcopenia is an age related health problem worldwide. It is a consequence of reduced muscle mass and strength making it a major contributing factor to falls and frailty thus leading to high prevalence of disabilities among the elderly. Increased expression of HSPs has been proven to be associated with increased muscle mass and size via activation of satellite cells and other proteins involved in the hypertrophy pathway. Additionally, overexpression of HSPs has been shown to prevent sarcopenia in rodents. Therefore, up regulation of HSPs may be a viable treatment for sarcopenia. Thus, we investigated whether heat therapy in the form of warm water immersion (WWI) can increase the expression of HSPs (HSP27, HSP70 and α B-crystallin) in elderly participants.

Participants (mean \pm SD: age = 74.4 ± 3.4 years, body mass = 79.75 ± 15.6 kg, height = 170.5 ± 7.3 cm) were immersed in 42°C water up to their waist for 2×15 minutes with a 30 minute interval between the two immersions. Thigh muscle temperature was monitored continuously throughout. *Vastus lateralis* muscle samples were taken before, 1 h and 48 h post immersion.



Immunofluorescence analysis was used to determine the localisation and expression of heat shock proteins (HSP27, HSP70 and α B-crystallin).

Intramuscular temperature increased by $3.6 \pm 1.7^{\circ}\text{C}$ from pre-immersion to end of second immersion. A significant main effect for time was found for HSP27, but post- hoc tests revealed no significant differences between time points. HSP70 and α B-crystallin tended to increase with time but this was not significant, likely due to small sample size.

In the present study heat therapy did not increase HSP expression in human skeletal muscle in elderly participants, however, these data are preliminary and need to be verified in a larger sample size.