

AGING DOES NOT AFFECT MUSCLE REGENERATIVE CAPACITY IN MICE

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Introduction: Muscle regeneration is an ongoing process which is increased after injury. Whether aging has any effect on this process is an ongoing question. The present study examined myofiber size and adipocyte accumulation within regenerated muscle in a murine model of aging.

Methods: Three age groups of C57Bl/6J mice were studied: young (4-6 months old), middle (12-14 months) and old (25+ months). Cardiotoxin (CTX) was injected to cause muscle injury. After fourteen days, light microscopic histomorphometry was used to quantitate tibialis anterior myofiber size (cross-sectional area, μm^2) and intramuscular adipocyte content (% of regenerated muscle area).

Results: At baseline, young and middle aged male mice had similar fiber size while older mice had smaller myofibers (2628 ± 52.1 , 2797 ± 62.7 , $2090 \pm 124.9 \mu\text{m}^2$ respectively). Female mice showed a similar pattern (2115 ± 68.4 , 2077 ± 60.7 , $1499 \pm 206.5 \mu\text{m}^2$ respectively). After injury, male mice demonstrated similar myofiber size when compared to baseline (1632 ± 101.6 , 1523 ± 43.6 , $1402 \pm 75.1 \mu\text{m}^2$, from young to old). Females exhibited the same pattern of regeneration when compared to their own baseline (1624 ± 81.5 , 1423 ± 36.9 , $1326 \pm 68.4 \mu\text{m}^2$ respectively). Fat was zero at baseline for both male and female mice regardless of age. Following injury, male mice had similar adipocyte accumulation when compared to each other while females accumulated two to four times the amount of fat that males did at the same time point.

Conclusion: Muscle regeneration is not significantly affected by aging. Female mice gain more adipose tissue after injury than males; however, this is not related to age.

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