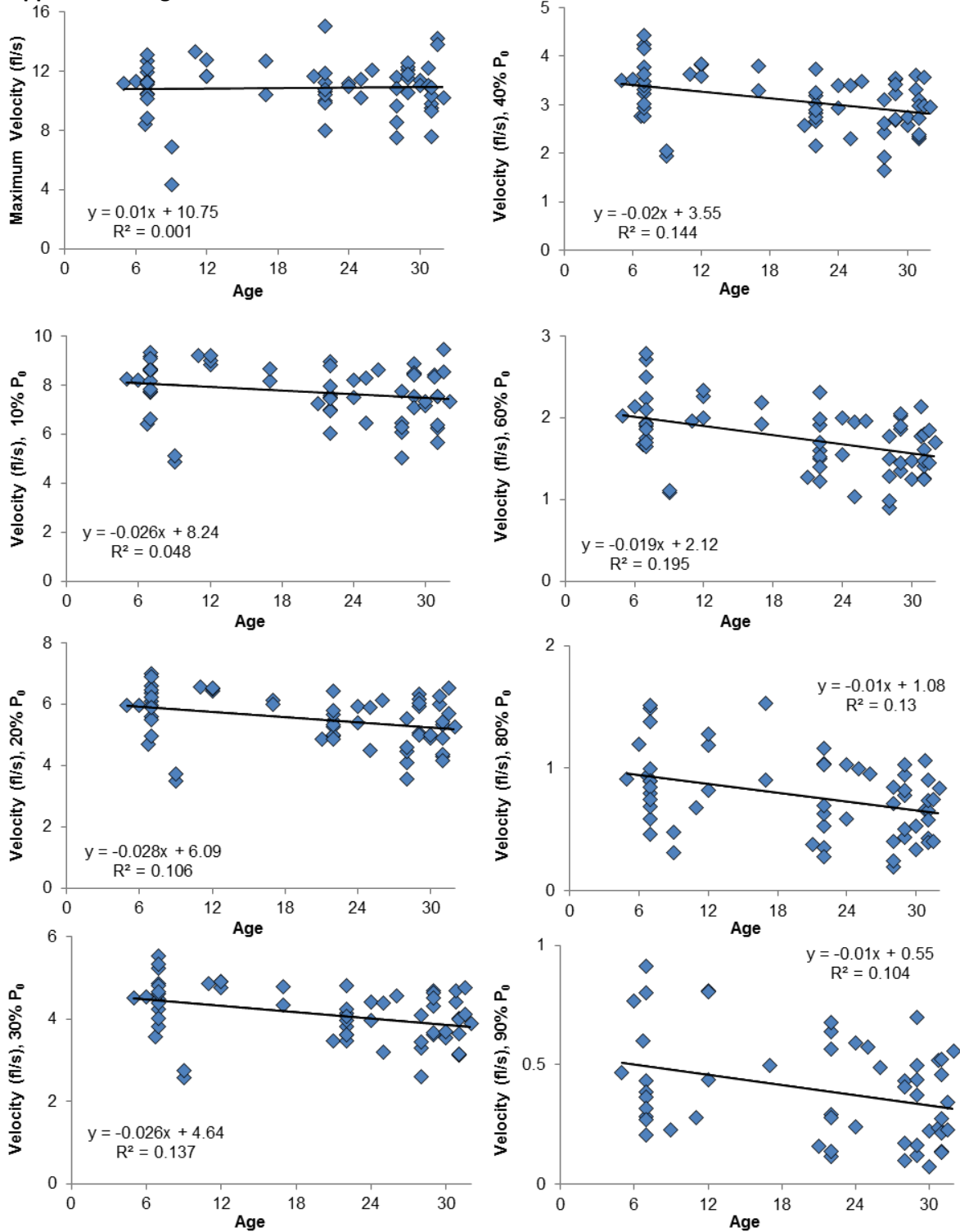


Online Resource 2

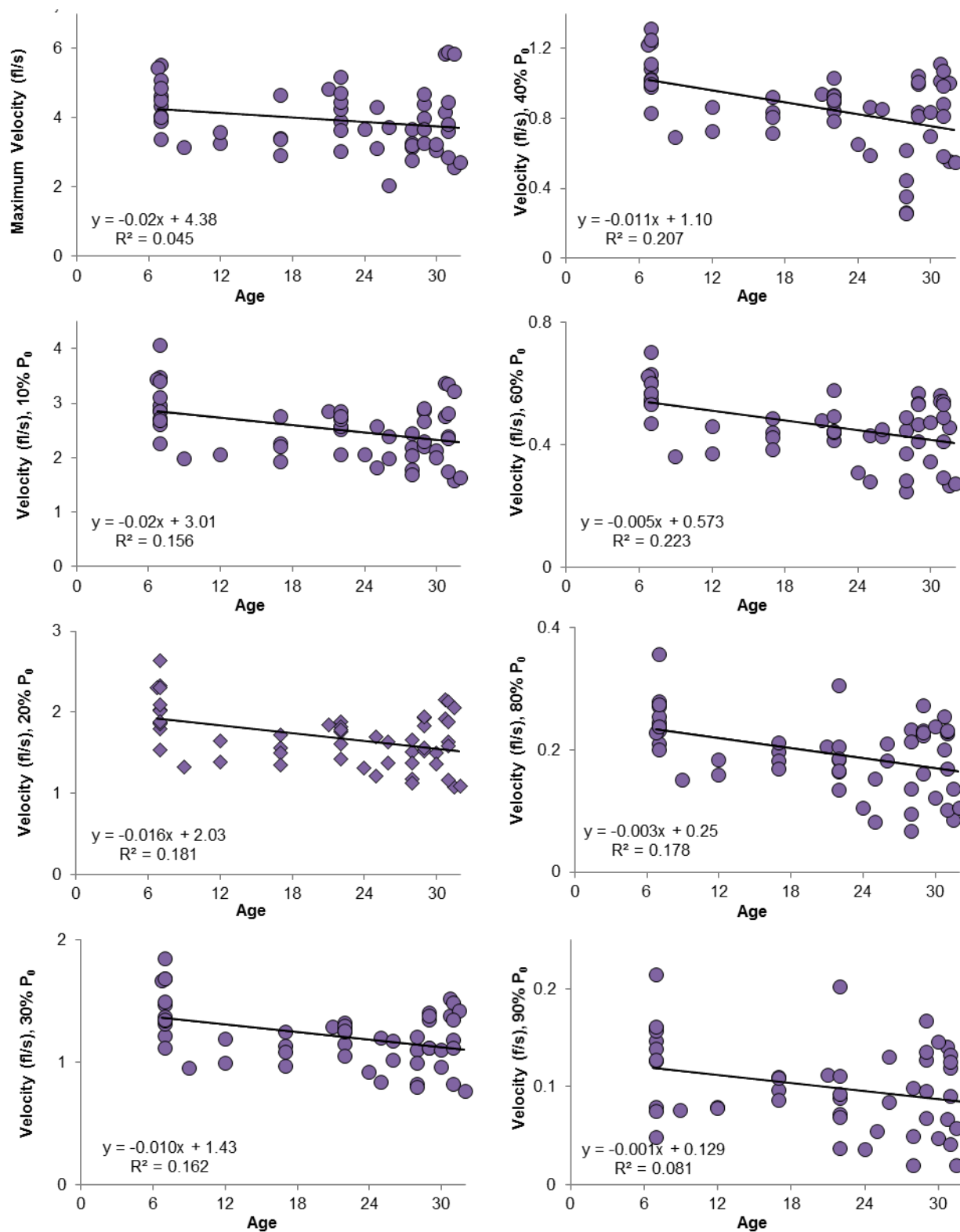
Supplemental Figures S1-S7



**Figure S1 EDL Loaded Velocity Declined with Age.** There was a significant negative correlation between velocity and age at the measured loads (20-90%P<sub>0</sub>). V<sub>max</sub>, however, (which was non-physiological and represented what velocity would be if a muscle was completely unloaded) did not change in a linear manner over the lifespan. Each diamond represents a measurement from an individual mouse. Age: Age of mouse in months. Equation: simple linear regression of velocity (y) as a function of age (x). fl/s = fiber lengths per second. x% P<sub>0</sub> = percentage of maximum tetanic force when the velocity measurement was taken. Maximum Velocity: V<sub>max</sub>, maximum unloaded velocity.

**C57BL/6 Lifespan Study: Age-Related Declines in Muscle Power Production and Contractile Velocity**

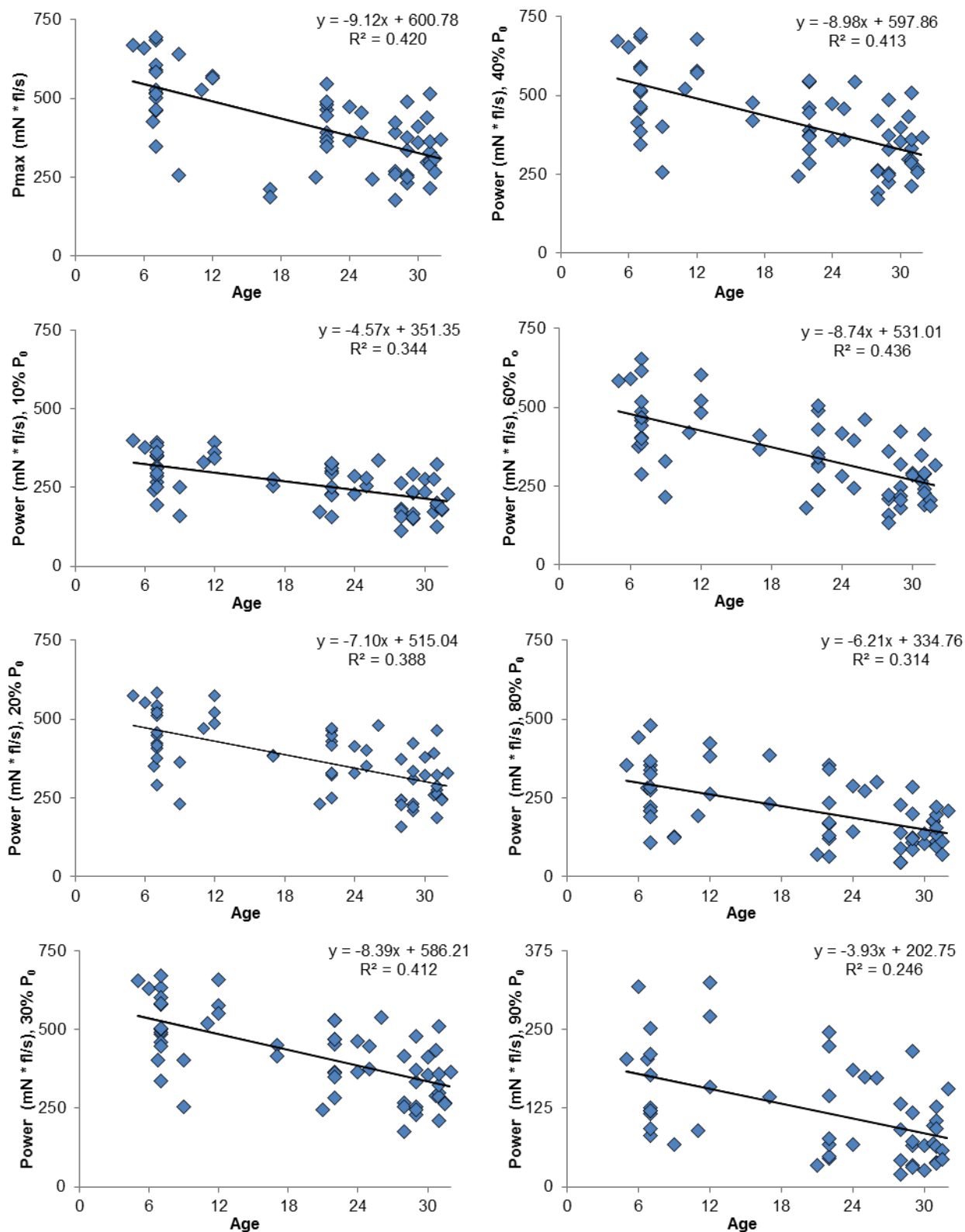
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**Figure S2 SOL Loaded Velocity Declined with Age.** There was a significant negative correlation between velocity and age at the measured loads (10-90% $P_0$ ).  $V_{max}$  (which was non-physiological and represented what velocity would be if a muscle was completely unloaded) did not change in a significant linear manner over the lifespan. Each diamond represents a measurement from an individual mouse. Age: Age of mouse in months. Equation: simple linear regression of velocity (y) as a function of age (x). fl/s = fiber lengths per second. x%  $P_0$  = percentage of maximum tetanic force when the velocity measurement was taken. Maximum Velocity:  $V_{max}$ , maximum unloaded velocity.

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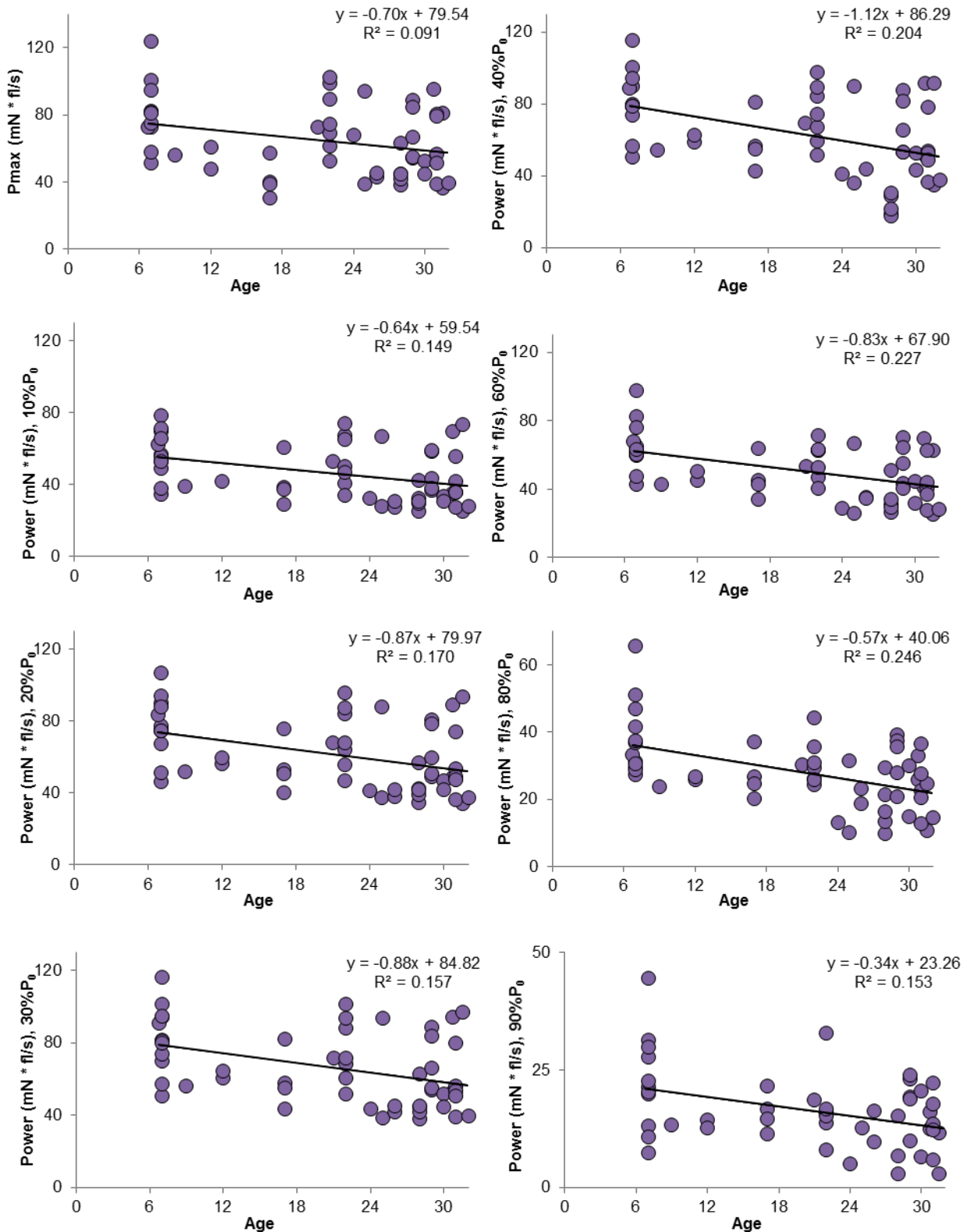
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**Figure S3 EDL Power Declined with Age.** There was a significant negative linear correlation between power production and age at the measured loads (10-90%P<sub>0</sub>) and at P<sub>max</sub> (maximum power). x% P<sub>0</sub>= "x" percentage of maximum tetanic force when the power measurement was derived. Each symbol (diamond) represents a measurement from an individual mouse. Power measured in milliNewtons \* fiber lengths per second (mN \* fl/s). Age: age of mouse in months. Equation: simple linear regression of power (y) as a function of age (x).

**C57BL/6 Lifespan Study: Age-Related Declines in Muscle Power Production and Contractile Velocity**

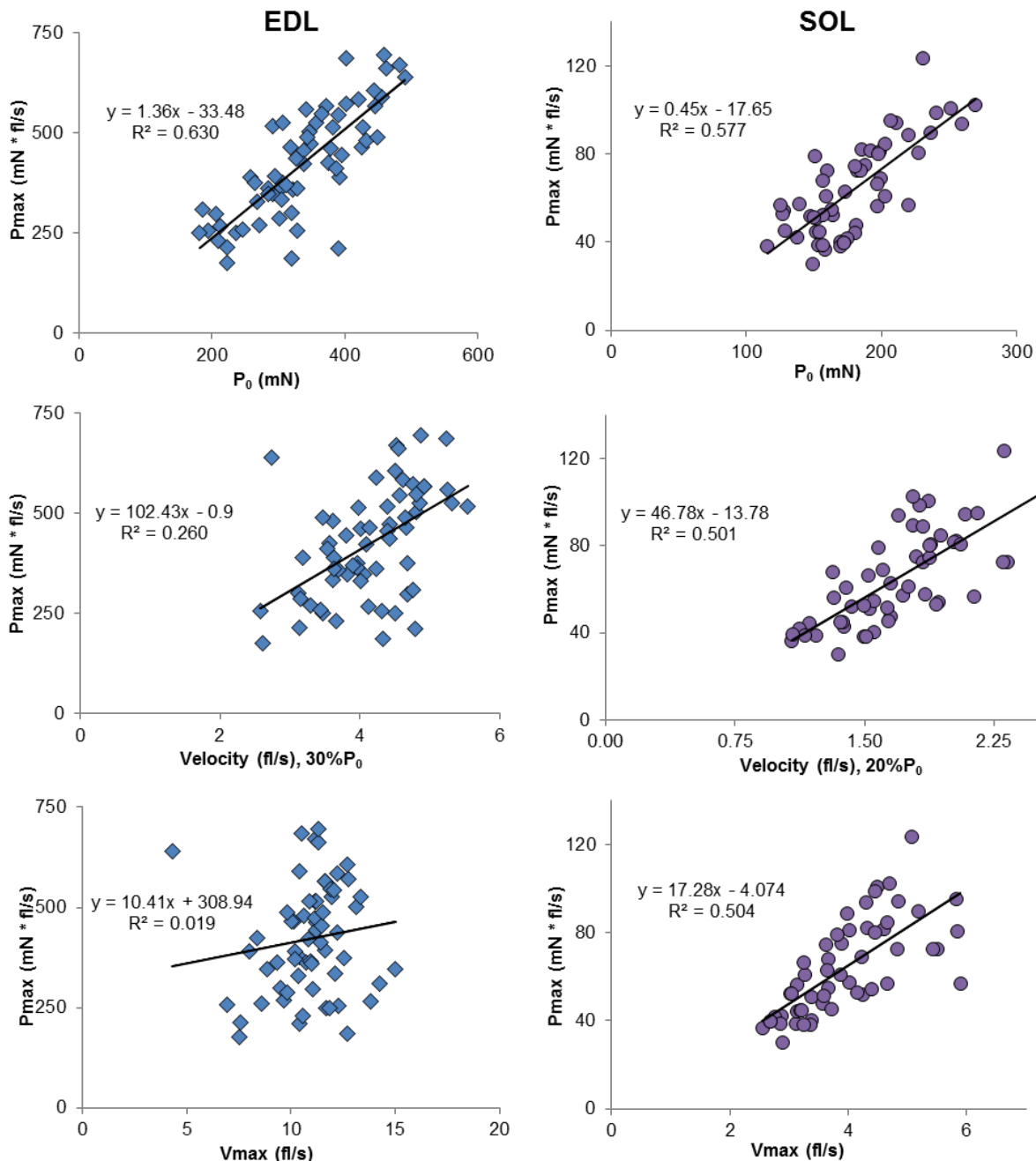
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**Figure S4 SOL Power Production Declined with Age.** There was a significant negative correlation between power and age at the measured loads (10-90%P<sub>0</sub>) and at P<sub>max</sub>. Power measured in milliNewtons \* fiber lengths per sec (mN\*fl/sec). x% P<sub>0</sub>= "x" percentage of maximum tetanic force when the power measurement was derived. Each symbol (circle) represents a measurement from an individual mouse. Age: age of mouse in months. Equation: simple linear regression of power (y) as a function of age (x).

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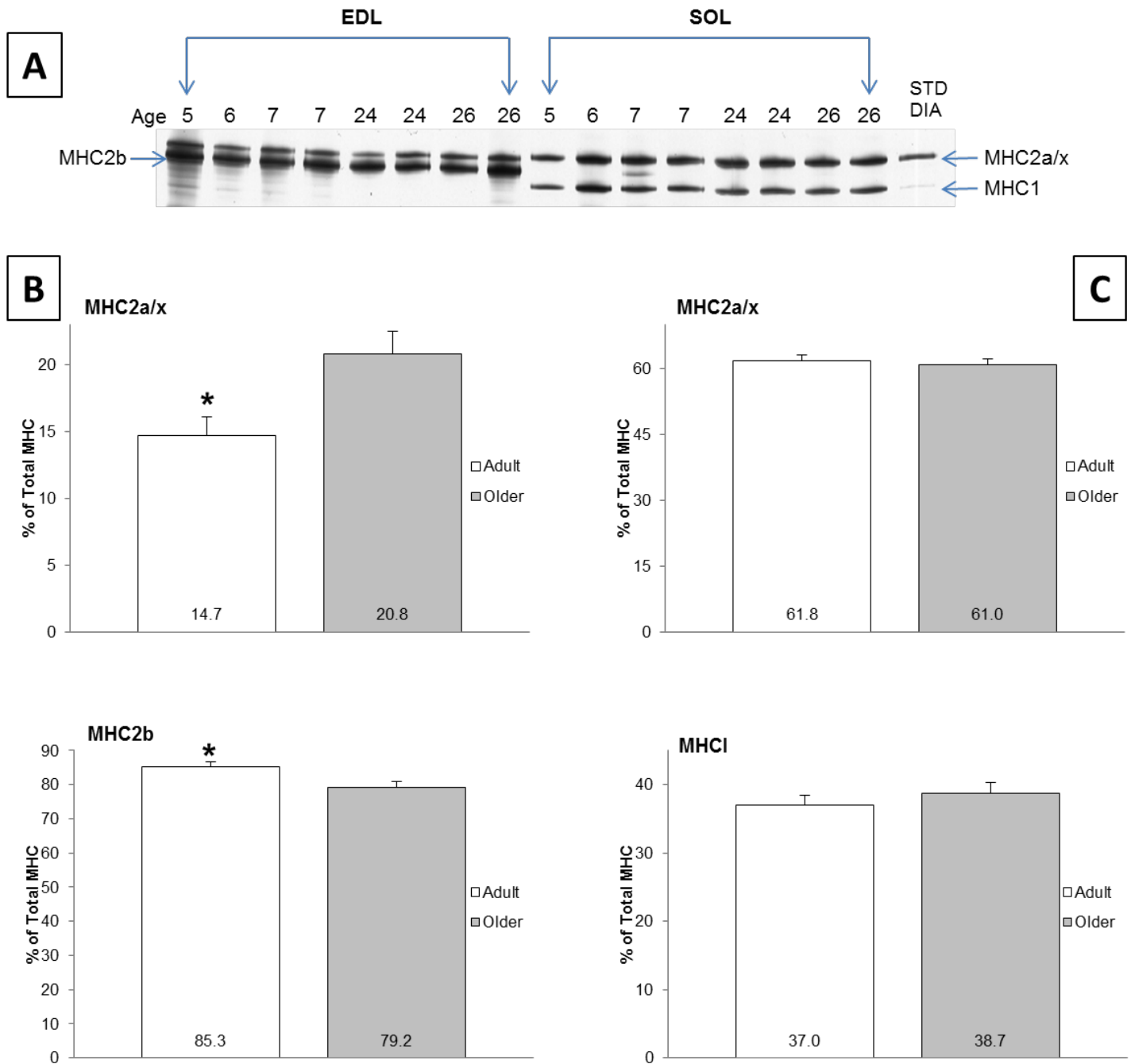
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**Figure S5 Relationship of P<sub>max</sub>, P<sub>0</sub> and Velocity.** In both the EDL and SOL, P<sub>max</sub> (maximum power) and P<sub>0</sub> (maximum tetanic force) (R=0.79 and 0.76, respectively, both p<0.001), and P<sub>max</sub> and Velocity (R=0.51 and 0.71, both p<0.001) were correlated. In the EDL, P<sub>max</sub> and V<sub>max</sub> (maximum unloaded velocity) were not related. However, there was a significant correlation (R=0.71) between SOL V<sub>max</sub> and P<sub>max</sub>. P<sub>max</sub> measured in milliNewtons \* fiber lengths per second (mN \* fl/s) and velocity measured in fiber lengths per second (fl/s). Each symbol (diamond for EDL and circle for SOL) represents measurements taken from one mouse. Equation is of a simple linear regression of P<sub>max</sub> (y) being a function of the x-axis variable (P<sub>0</sub>, velocity x% of P<sub>0</sub>, or V<sub>max</sub>).

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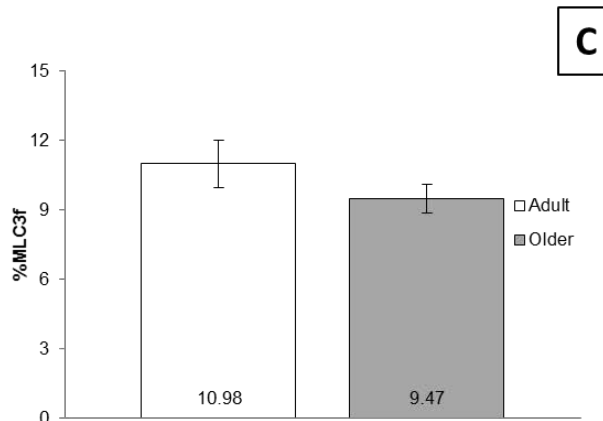
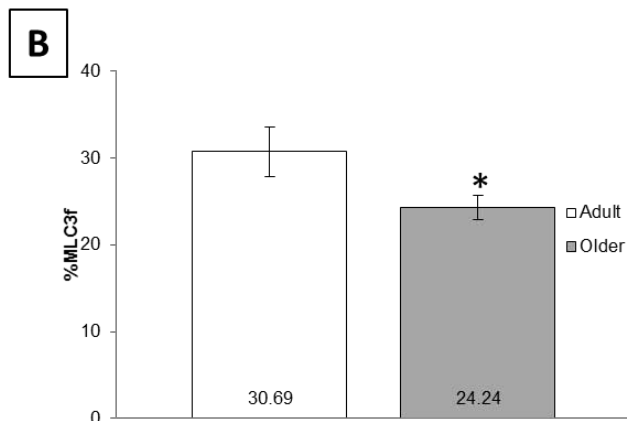
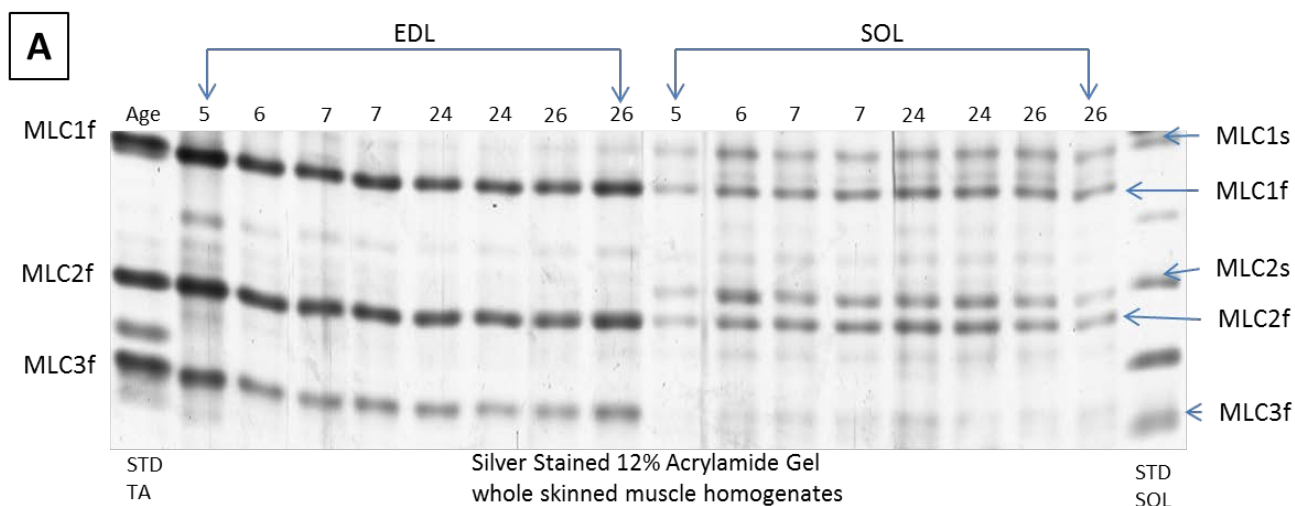
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**Figure S6 MHC Composition with Age. A. Representative Gel Image.** Silverstained 5% Acrylamide large format gel. **B. EDL** Expression of MHC2/ax increased by 6% in older (21%,  $n=25$ , mean age=28 months,  $p=0.009$ ) compared to adult mice (15%,  $n=18$ , mean age=7 months) using Student's t-test, implying a shift towards a slower isoform composition. Conversely, MHC2b expression is reduced by 6% with age (Adult 85%, Old 79%,  $p=0.01$ ). **C. SOL** There was no change in the SOL MHC expression profile (Adult: MHC2ax 62%, MHC1 37%,  $n=15$ , mean age=7.8 months; Older: MHC2ax 61%, MHC1 39%,  $n=18$ , mean age=27.8). Each lane represents whole homogenized muscle of one mouse at the age listed on top. Age: age in months of mouse. STD DIA: standard from rat diaphragm (proteins identified using mass spectrometry).

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**Figure S7 MLC3f Percentage Decreased 21% with Age in EDL. A. Representative Gel Image.** Silver-stained 12% Acrylamide large format gel. **B. EDL** There was a 21% decline in MLC3f with age. **C. SOL** There was no change in MLC3f. Adult group (EDL, 31% MLC3f, n=19, mean age=7.5; SOL % MLC3f, n=18, mean age=7.4) was compared to combined old/elderly group, Older (EDL, 24% MLC3f, n=23, mean age =27.9; SOL, % MLC3f, n=22, mean age=27.8) using Student's t-test (EDL, p=0.03; SOL p=0.20). Each lane represents whole homogenized permeabilized muscle of one mouse at the age listed on top. Age= age in months of mouse. STD TA: rat tibialis anterior standard. STD SOL: rat SOL standard. Standard proteins identified via mass spectrometry. MLC (myosin light chain) is shown with three essential light chain isoforms (1s, 1f, 3f) and 2 two regulatory light chain isoforms (2s, 2f). s = slow. f = fast. Number in base of columns in chart equals average percentage of MLC3f out of total. Note: %MLC3f is out of the total of fast MLC [MLC3f / (MLC1f+MLC3f)], in SOL MLC1s was not counted.