56. INVESTIGATION OF ANDROGEN ACTION IN SKELETAL MUSCLE GROWTH AND FUNCTION

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The anabolic effects of androgens on skeletal muscle have long been recognised and exploited by athletes, but the definitive mechanism of androgen action in muscle growth and maintenance remains poorly understood. Our aim is to investigate the physiological effect of androgens on skeletal muscle growth and function using an *in vivo* androgen withdrawal/replacement mouse model. Orchidectomised (Orx) male mice received 3 intraperitoneal 0.1 mg testosterone (T) implants (Orx+T, $n = 6$) or vehicle (Orx, $n = 5$) for 11 weeks. Serum testosterone levels were measured and the following muscles were excised and weighed: extensor digitorum longus (EDL), soleus (SOL), quadriceps, plantaris, gastrocnemius, tibialis anterior and levator ani (LA). LA muscle sections were assessed for fibre cross-sectional area. Following 11 weeks treatment Orx mice had negligible serum T levels (mean ± SE; 0.4 nM ± 0.1) compared to Orx+T mice (31 nM ± 7.1, $P<0.001$). Orx+T mice showed a statistically significant increase in muscle mass compared to controls for fast-twitch (EDL; Orx = 9.1 mg ± 0.3, Orx+T = 11.4 mg ± 0.5, $P<0.005$) and slow-twitch (SOL; Orx = 7.8 mg ± 0.3, Orx+T = 10 mg ± 0.5, $P<0.01$) muscle types, as well as all other muscle groups analysed. These mice also displayed a marked increase in LA fibre area (81% increase compared to Orx, $P<0.001$). We have observed significant muscle degeneration upon androgen withdrawal *in vivo* as reflected by a decrease in muscle mass and fibre size. Androgen replacement via testosterone implant prevented muscle atrophy by promoting hypertrophy of fibres. We are currently assessing the impact of androgen withdrawal/replacement on muscle function parameters such as maximum force, power output and fatigue to determine the relationship between androgen-induced muscle hypertrophy and strength.

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