

The long and short of non-coding RNAs during post-natal growth of skeletal muscles in mice: a focus on lncRNA and miRNAs

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Introduction: Post-natal growth of skeletal muscle is a dynamic process involving proliferation and fusion of myoblasts with myofibres (hyperplasia) up until 3 weeks post-natally in mice, with further increases in myofibre size mostly by hypertrophy until about 12 weeks of age. The expression of mRNAs that control these events are well described, but little is known about the *in vivo* roles of non-coding RNAs (ncRNAs), including microRNAs (miRNAs) and long non-coding RNAs (lncRNAs).

Aim: To perform time course analyses of a broad range of RNAs, including mRNAs, miRNAs and lncRNAs during post-natal growth of skeletal muscle.

Method: Mice were anaesthetized with isoflurane and muscles removed for analysis. We determined expression patterns of lncRNAs (including Neat1, Malat1, Sra and Meg3), miRNAs (miR-1, miR-133a and miR-206) and mRNAs in muscles of male C57Bl/6J mice at 2 days and 2, 4, 6 and 12 weeks after birth.

Results: Generally, RNA levels decreased, either gradually after 2 weeks (MyoD, MyoG and IGF1R), or rapidly between 2 days and 2 weeks (miR-206, Meg3 and LmnA). However, Sra and Malat1 lncRNAs remained stable during post-natal growth, and several RNAs showed increased expression during the hyperplastic phase, with stable RNA levels during the predominantly hypertrophy phase (Neat1 variants, miR-1 and miR-133a).

Conclusion: These measurements of RNAs during post-natal skeletal muscle growth provides a novel focus on ncRNAs and their potential roles during this dynamic and often overlooked growth period, and emphasises the need for further *in vivo* studies on ncRNAs.