



**Supplemental Figure 1.** ICV injections of AAV8-hSMN targeted the cervical spinal cord for transduction. Shown are hSMN immuno-staining of cervical tissue sections from untreated (A), ICV-only injected (B), and lumbar-only injected (C) heterozygote mice. The ICV-only injections resulted in the cervical spinal cord expression of hSMN (B, arrows demarcate transduced cells). This was in contrast to intraparenchymal injection of the lumbar segment that showed very little transduction of the cervical spinal cord, presumably due to the distal proximity from the injection site (C). On occasion, we observed SMN immuno-positive signal that possessed a gem-like appearance (arrowhead) in the nucleus of untreated heterozygote and wild-type mice (A). However, we never observed this immuno-staining pattern in the nucleus of untreated SMA mice. Scale bar, 50  $\mu$ m (A-C).

**Supplemental Video 1.** Shown are two scAAV-hSMN-treated SMA mice and an age-matched untreated WT mouse at 240 days. The two treated SMA mice can be easily identified by their shorten tail.