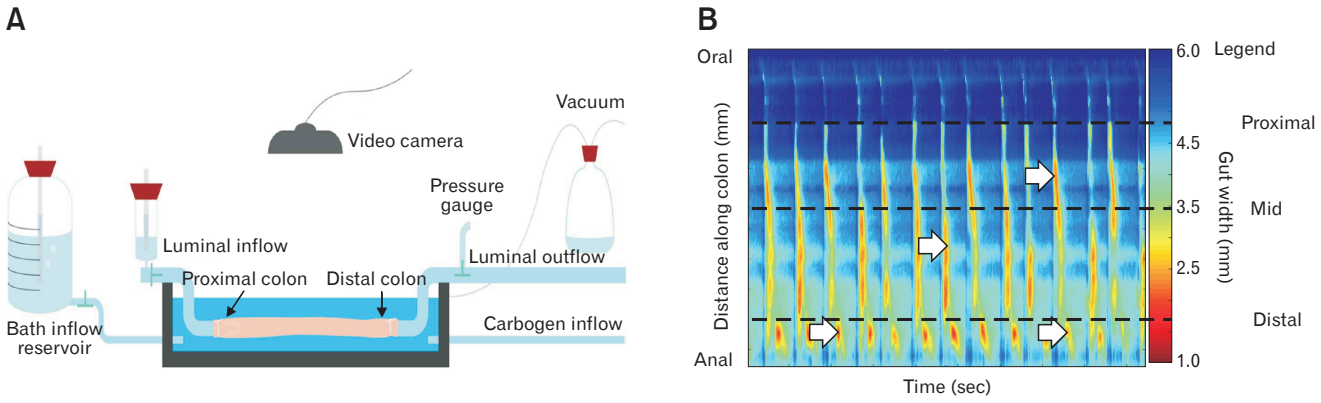
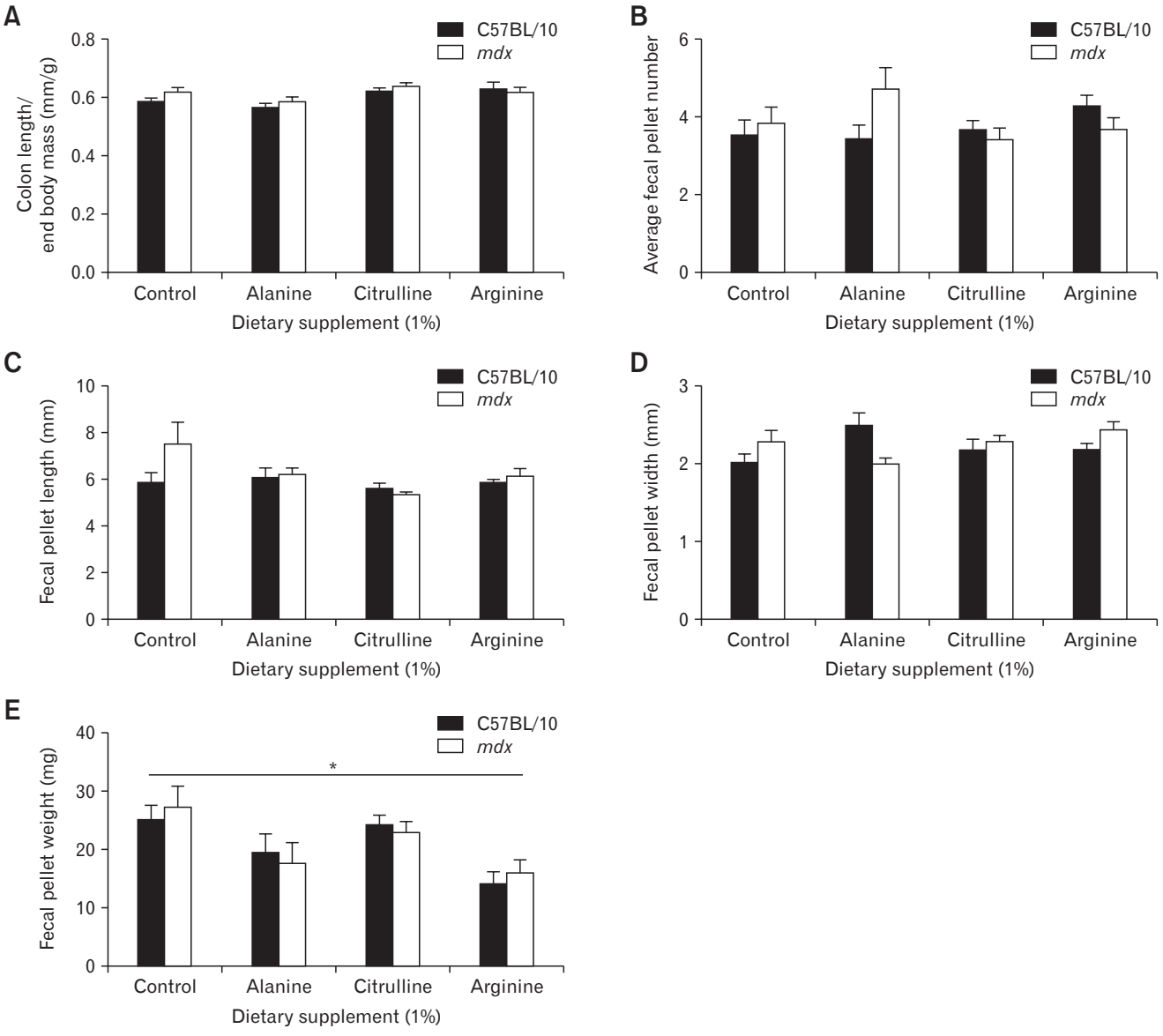
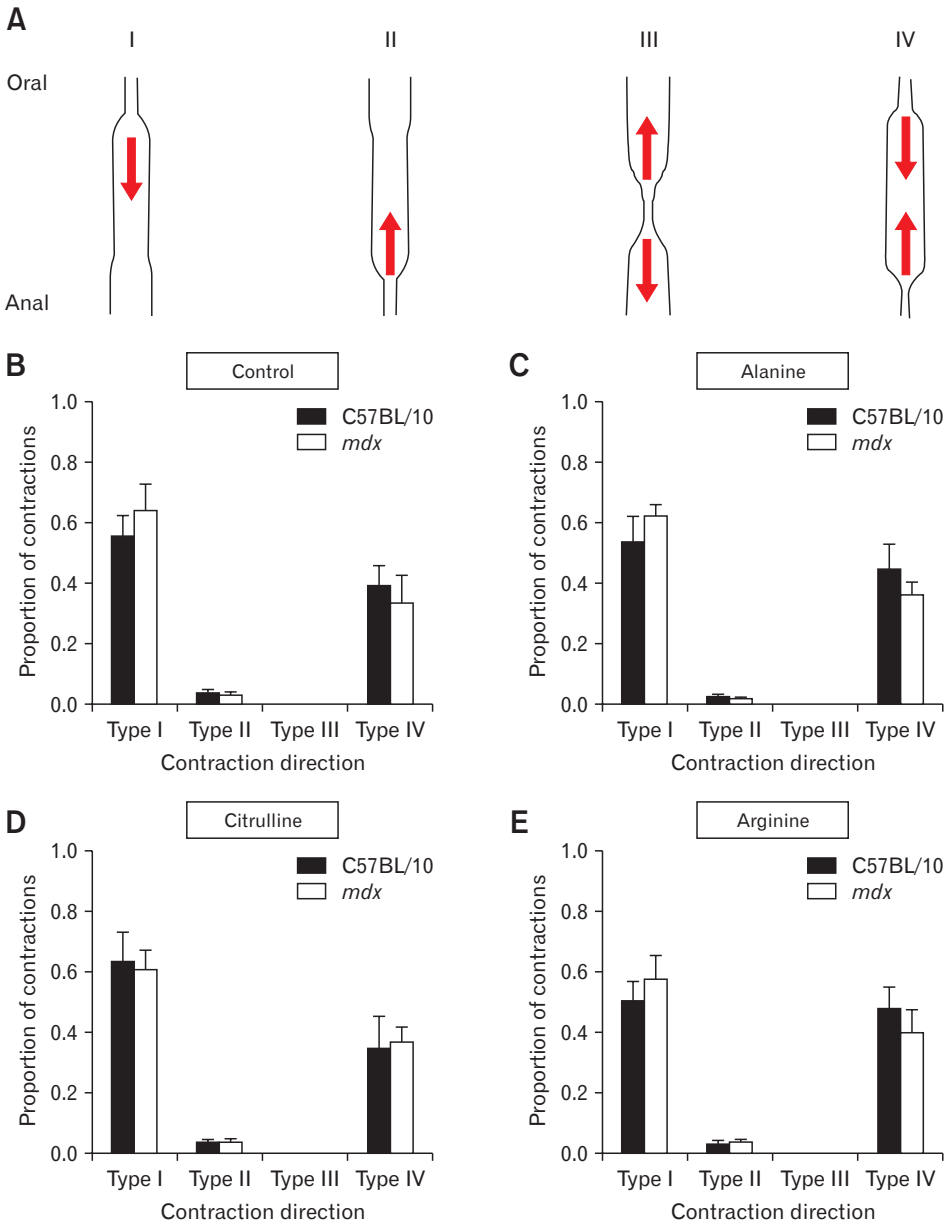


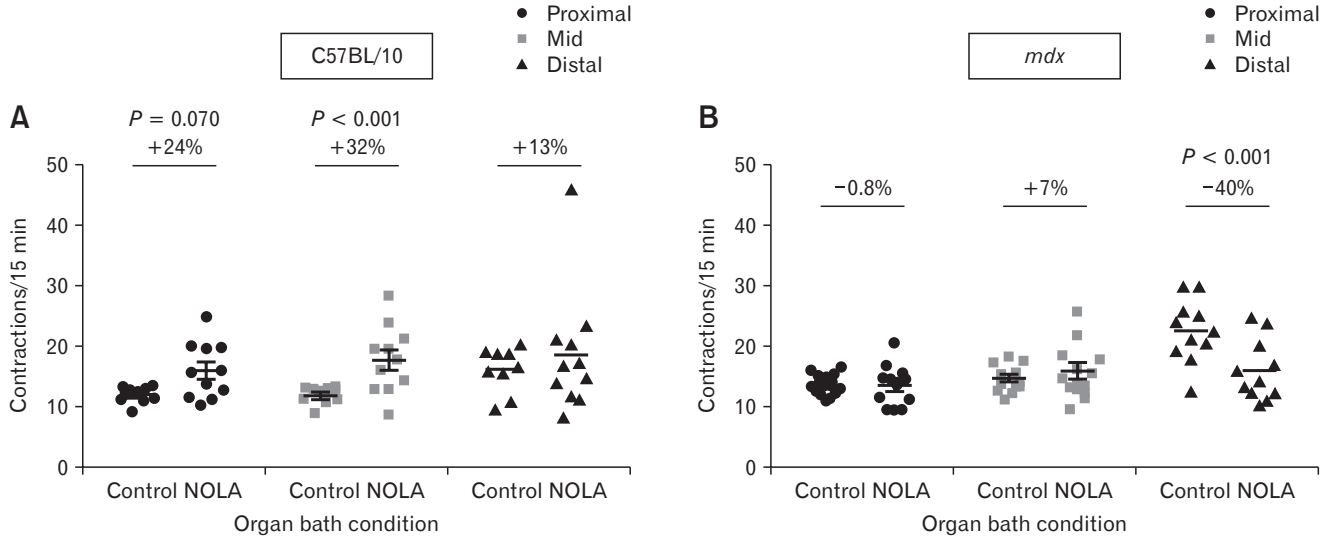
Supplementary Figure 1. Video imaging and spatiotemporal mapping of colon contractile function. (A) To examine colon contractile function, mice were sacrificed by cervical dislocation and the colon was excised and cannulated at both oral and anal ends in an organ bath containing physiological saline, which was constantly bubbled with Carbogen (95% CO_2, 5% O_2). A Logitech Quickcam Pro 9000 camera was positioned above the bath to capture the entire colon. (B) Spatiotemporal maps were generated for each 15-minute video recording. The y-axis depicts the distance along the colon, from oral to anal. The x-axis depicts time. Each colour depicts the diameter of the colon (mm) and corresponds to the legend. Red represents a constricted colon and dark blue represents a dilated colon. Each red/yellow streak depicts a contraction (arrows). Regions chosen for measurement of contraction number or colon diameter at the proximal, mid, and distal colon are shown by broken lines.



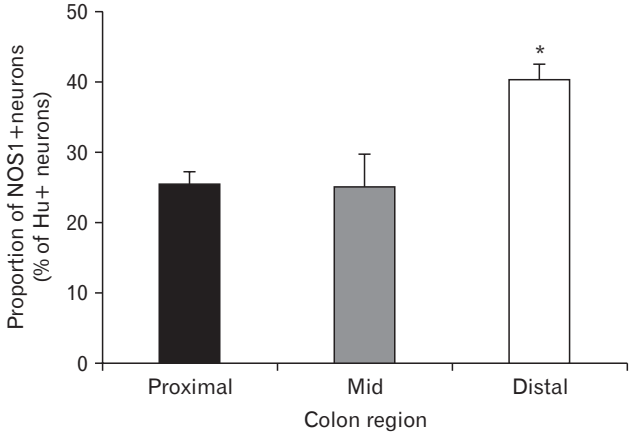
Supplementary Figure 2. Oral amino acid supplementation does not alter fecal pellet production. At the conclusion of treatment, anaesthetized mice were sacrificed by cervical dislocation, the colon was removed and imaged for later determination of length (A). Fecal pellets were flushed from excised colons of 12-week-old C57BL/10 and *mdx* mice receiving the specialized control diet (control) or the specialized diet supplemented with 1% L-alanine, 1% L-citrulline, or 1% L-arginine. Fecal pellet number (B), length (C), width (D), and weight (E) were determined. Statistical analysis was performed using a two-way ANOVA with a Bonferonni's *post-hoc* multiple comparisons test to determine the effects of genotype and diet. $*P < 0.05$ diet main effect. n = 9-12/genotype/group.



Supplementary Figure 3. Contraction propagation polarity is similar in colons from C57BL/10 and *mdx* mice. Colon contraction propagation polarity was assessed by determining the initiation point and propagation direction of contraction from spatiotemporal maps. (A) Contractions were defined as type I (propagating from oral to anal), type II (propagating from anal to oral), type III (propagating oral and anal from a common point), and type IV (propagating oral and anal from each end of the colon). The proportion of each contraction type was measured in colons from C57BL/10 and *mdx* mice receiving control (B), alanine-supplemented (C), citrulline-supplemented (D), and arginine-supplemented (E) diets. Statistical analysis was performed using a two-way ANOVA with a Bonferonni's *post-hoc* multiple comparisons test. n = 5-11/genotype/group.



Supplementary Figure 4. Inhibition of nitric oxide synthase (NOS) increases contraction number in colons from C57BL/10 but not *mdx* mice. Dot plot of contraction number data from Figures 1 and 3 showing the percentage change in contraction number in the proximal, mid, and distal colon segments from C57BL/10 (A) and *mdx* (B) mice fed the control diet bathed in physiological saline (control) compared to 100 μM N-nitro-L-arginine (NOLA). Statistical analysis was performed using a Mann-Whitney *U* test. n = 9-12/genotype/group.



Supplementary Figure 5. The proportion of neuronal nitric oxide synthase (nNOS, also known as NOS1) positive neurons is higher in the distal colon than in the proximal or mid colon. Whole mount sections of myenteric plexus obtained from the proximal, mid, and distal colon of C57BL/6 mice were immunostained with the pan-neuronal marker (Hu) and an antibody to NOS1 to identify NOS1 positive neurons. Sections were imaged and the number of cells immunoreactive for either Hu alone or both Hu and NOS1 counted. Statistical analysis was performed using a 1-way ANOVA with a Bonferonni's *post-hoc* multiple comparisons test. $*P < 0.05$, n = 5/region.