**Description of Additional Supplementary Files**

File Name: Supplementary Movie 1

Description: High-protein diet increased fluctuations of CCHa1+ EECs GCaMP8f (green) and turboRFP (red) signals of the posterior midgut of CCHa1- T2A-GAL4>GCaMP8f, turboRFP flies. Midguts of flies reared on a standard diet (1-13 sec) or a high-protein diet (13-25 sec) were visualized. Each numbered region is magnified during comparison (26-44 sec). Note that the cells of the high-protein diet-reared gut surrounded by the yellow box showed high fluctuations and are considered responders.

File Name: Supplementary Data 1

Description: Compositions of diets used in this study Compositions of high-protein diets, amino acid-supplemented diets, and amino acid mixture solution composition are shown.

File Name: Supplementary Data 2

Description: Primer sequences for qPCR used in this study Primer sequences used for qPCR are listed.