Supplementary Materials

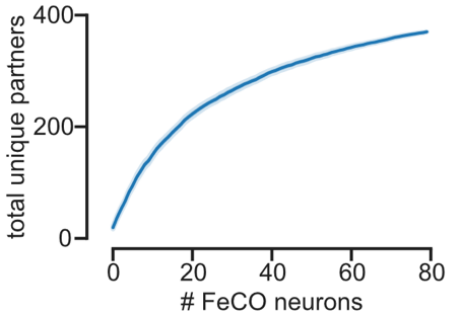

Figure S1. Novel partners analysis suggests we have reconstructed a meaningful fraction of the FeCO axons from the front left leg. Plot shows the average number of new postsynaptic partners added to our dataset per each FeCO sensory neuron we reconstructed. We randomly sampled the FeCO neurons one at a time (without replacement) in a cumulative fashion, and calculated how many novel postsynaptic partners were connected to each additional FeCO neuron. We resampled fifty times. Mean (solid line) and standard error (shaded region surrounding line) are plotted.

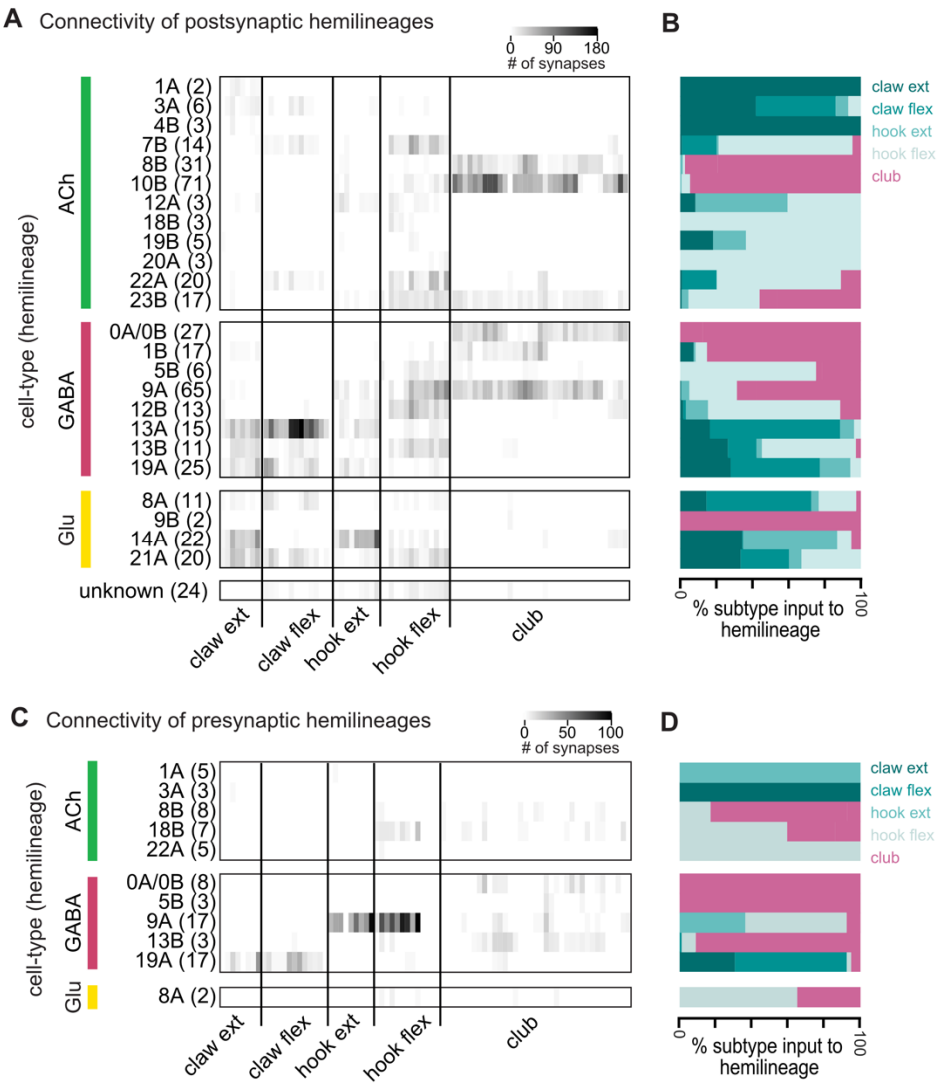

Figure S2. Subtypes of FeCO axons preferentially synapse with VNC neurons from specific developmental lineages. (A) The total number of synapses made by each FeCO neuron (columns) onto VNC neurons of each hemilineage (rows). Hemilineage was identified based on morphological characteristics of VNC neurons (see methods). Only local, ascending, and intersegmental postsynaptic partners are included in this analysis. VNC neurons of a given hemilineage are grouped together, with the number of neurons in each hemilineage indicated in parentheses. Hemilineages are grouped according to their primary neurotransmitter (ACh: acetylcholine, GABA: Gamma-aminobutyric acid, Glu: glutamate). (B) Percent of total FeCO input to a hemilineage made by each FeCO subtype. (C) The total number of synapses onto each FeCO neuron (columns) by presynaptic VNC neurons of each hemilineage (rows). (D) Percent of total inputs by a hemilineage onto each FeCO subtype.

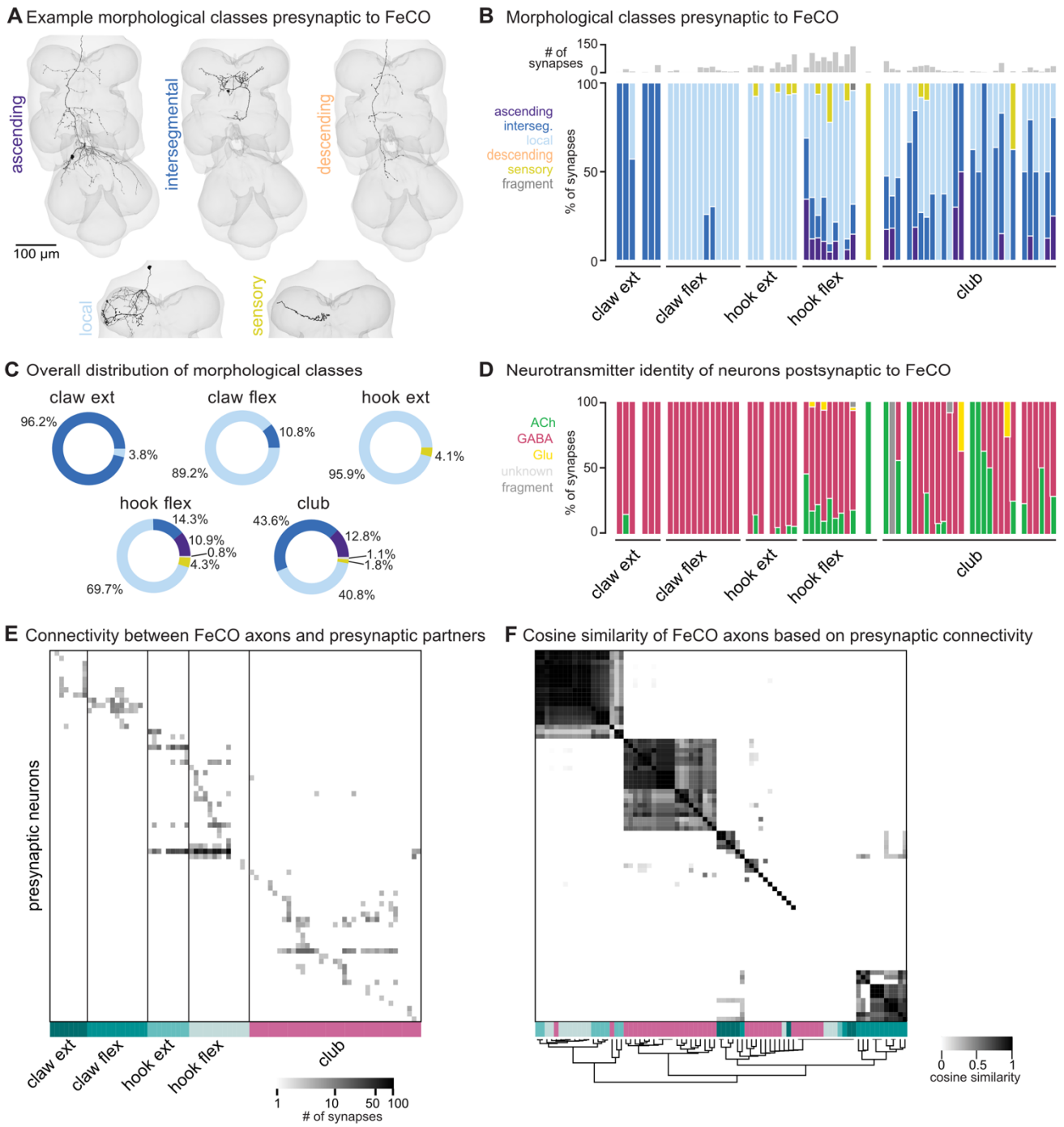

Figure S3. FeCO neurons exhibit subtype-specific presynaptic connectivity. (A) We reconstructed all VNC neurons presynaptic to FeCO axons from the front left leg (T1L) and classified them into morphological classes: ascending, descending, intersegmental, local, and sensory. Example provided from each class. (B) Percent of synapses received by each FeCO axon from VNC neurons of each morphological class. Top bar plot shows the total number of input synapses received by each FeCO axon. (C) Per FeCO subtype, the total fraction of input synapses received from each morphological class. (D) Proportion of total synapses made onto each FeCO neuron by presynaptic cholinergic (green), glutamatergic (yellow), GABAergic (pink), and unidentified (light gray) hemilineages. (E) Connectivity matrix between FeCO axons and presynaptic VNC neurons. The shading of each tick indicates the number of synapses from each presynaptic VNC neuron (row) onto each FeCO axon (column). Colored bars along the bottom indicate the postsynaptic FeCO subtype for that column. FeCO axons are organized by morphological subtype and then by their cosine similarity scores. VNC neurons are organized by their cosine similarity scores. (F) Clustered pairwise cosine similarity matrices of all FeCO axons based on their presynaptic connectivity. FeCO neurons with similar presynaptic connectivity patterns cluster together, forming connectivity clusters.

Supplemental Table 1. Neuroglancer links to FeCO axons by subtype

Club	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/clubs.json
Hook extension	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/hookE.json
Hook flexion	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/hookF.json
Claw extension	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/clawE.json
Claw flexion	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/clawF.json

Supplemental Table 2. Neuroglancer links to VNC neurons by hemilineage

All presynaptic partners	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/all_upstream.json
All postsynaptic partners	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/all_downstream.json
Postsynaptic 0A/0B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_0a0b.json
Postsynaptic 1A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_1A.json
Postsynaptic 1B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_1B.json
Postsynaptic 3A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_3A.json
Postsynaptic 4B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_4B.json
Postsynaptic 5B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_5B.json
Postsynaptic 7B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_7B.json
Postsynaptic 8A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_8A.json
Postsynaptic 8B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_8B.json
Postsynaptic 9A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_9A.json
Postsynaptic 9B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_9B.json

Postsynaptic 10B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_10B.json
Postsynaptic 12A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_12A.json
Postsynaptic 12B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_12B.json
Postsynaptic 13A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_13A.json
Postsynaptic 13B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_13B.json
Postsynaptic 14A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_14A.json
Postsynaptic 18B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_18B.json
Postsynaptic 19A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_19A.json
Postsynaptic 19B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_19B.json
Postsynaptic 20A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_20A.json
Postsynaptic 21A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_21A.json
Postsynaptic 22A	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_22A.json
Postsynaptic 23B	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/DS_23B.json

Postsynaptic motor neurons	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/MN.json
Postsynaptic unknown	https://neuromancer-seung-import.appspot.com/?json_url=https://raw.githubusercontent.com/sagrawal/Lee_2024/main/jsons/unknown.json

Supplemental Table 3. Neuroglancer links to ascending club, 8B, and 10B neurons in Flywire

Ascending neurons	ascending club neurons ascending 8B/10B neurons