With an ultimate goal of making the first complete biomimetic physical neural network, we started building and simulating the locomotor neural network of a small worm, C. Elegans. Central Objective: Design and simulation of Biomimetic CMOS Circuits to replicate undulating motion and touch based locomotion in Caenorhabditis Elegans.

**Challenges:**
- Types of synapse (synaptic transmission)
- Reciprocal inhibition
- Propagation of the signal
- Repeating signal

**Hypothesis:**
- We observed how these properties of the network's property of reciprocal inhibition (i.e., ventral should inhibit dorsal and vice versa, as well as the property that a full inhibitory network should inhibit itself)
- An assumption that recurrent propogation is not a property of signal in order to model this behavior synapses were constructed in compartments that would inhibit each other
- An assumption that propagation of signal as it moves along the body
- Although all Dorsal (Central Pattern Generator) and Ventral muscles were discovered in C. Elegans, one was constructed for this study to mimic just rhythm generation.

**Schematics**
- The complete C. Elegans Schematic
- Single Stage (Segment) Schematic

**Simulations and Results**
- Dorsal and Ventral muscles are reciprocally inhibiting each other to prevent paralysis of the worm at a certain stage.
- The worm lies on either the sinister or dexter side to crawl forwards motion.
- Axon hillocks produce action potentials in response to large stimuli, or swim.

**Conclusion:**
- The simulation results show that the network successfully shows touch sensitivity on the body and replicates undulatory motion of the worm C. elegans.
- A threshold of 2 was set and connections that appear more than twice in the partial connectome were kept in the stage that appear more than twice in the partial connectome were kept in the stage (mimicking nerve rings) which is then repeated six times to make the complete worm.

**References:**
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