Dendritic Arbors in the Mind of the Worm

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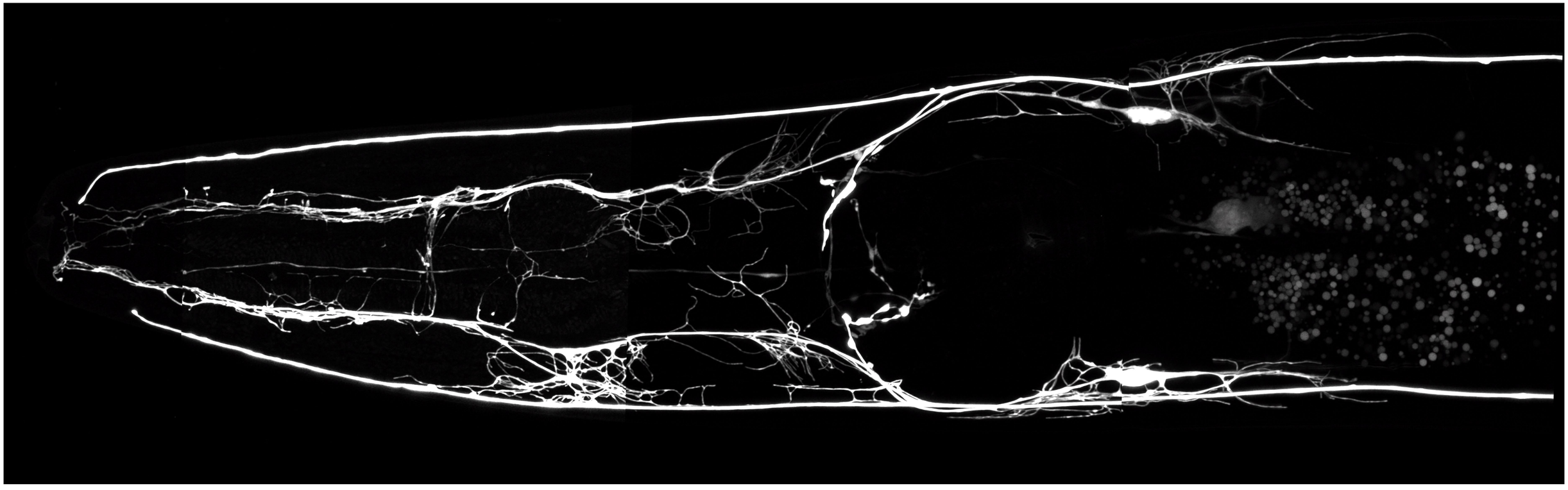

In the worm, C. elegans, we know every cell in their nervous system. There are 302. We know when each cell is born during development; what each of these cells senses; and which neighboring cells they communicate with; and what path their long, thin, delicate dendrite should follow through the worm's body. I'm interested in how the dendrite forms its distinct shape and how the shape of a dendrite is changed when the worms are stressed. Previously we had found that if the worms are raised in stressful conditions some cells in the worm would extend long dendritic arbors (branches) from their otherwise unbranched dendrite. My thesis project began by placing worms into a chemical bath that would cause random mutations in their offspring. I searched through thousands of animals to find the ones whose dendrites were tangled and unable to take on their usual shape. From those few new mutants I worked backwards to identify a protein complex which controlled the shape of the dendrite in both stressed and unstressed animals. This image shows the dendrites of an unstressed worm with a single mutation which prohibits the dendrite from arborizing evenly across the surface of its body.