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Sommario/riassunto	<p>The formation of the proper pattern of neuronal circuits during development is critical for the normal function of the vertebrate brain and for the survival of the organism. Circuit tracing studies spanning the past 100 years have revealed the beauty and exquisite intricacy of this pattern, which represents the most complex biological system known. In humans, aberrant circuit formation is a likely underlying cause of a wide variety of birth defects and neurological disorders, including autism, intellectual disability, and schizophrenia. Furthermore, future therapeutic approaches to restoring the function of damaged neural circuits will require a better understanding of the developmental constraints under which those circuits were originally assembled. For these reasons, elucidating the molecular mechanisms of neural circuit formation is a major goal of neurobiology today. Substantial progress towards this goal has been made over the past decade, and the pace of research in the field continues to accelerate with the development of novel molecular techniques and a wider variety of genetic model systems, including zebrafish and nematodes in addition to fruit flies and mice. The aim of this Research Topic is to bring together the many strands of research that shed light on the</p>

mechanisms driving neural circuit formation: studies of the differentiation of distinct neuronal subtypes; the formation of dendritic arbors and the elaboration of postsynaptic spines; the pathfinding, targeting, and branching of axons; the proper apposition of specific pre- and post-synaptic terminals; the emerging role of glial cells in facilitating synaptogenesis and synapse elimination; and the mutations behind the aberrant circuitry that leads to neurological disorders. We seek to highlight not only newly identified molecular mechanisms, but also technical advances that have allowed progress in the field to grow exponentially, including novel imaging techniques and the proliferation of large-scale “-omics” studies. We hope that this Research Topic will provide a forum for top researchers in the field to present new data, formulate novel hypotheses and models, and critically review recent progress in each step of neural circuit formation.

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