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Sommario/riassunto	The hypothalamus is the region of the brain in charge of the maintenance of the internal milieu of the organism. It is also essential to orchestrate reproductive, parental, aggressive-defensive, and other social behaviors, and for the expression of emotions. Due to the structural complexity of the hypothalamus, however, many basic aspects of its ontogenesis are still mysterious. Nowadays we assist to a renewal of interest spurred in part by the growing realization that prenatal and early postnatal influences on the hypothalamus could entail pathological conditions later in life. Intriguing questions for the future include: do early specification phenomena reflect on adult hypothalamic function and possibly on some kinds of behavior? Can early events like specification, migration or formation of nuclei influence adult hypothalamic function? A change in morphological paradigm, from earlier columnar interpretations to neuromeric ones, is taking place. Concepts long taken for granted start to be challenged in view of advances in developmental and comparative neurobiology, and notably also in the molecular characterization of hypothalamic structures. How should we understand the position of the hypothalamus in relation to other brain regions? Should we bundle it together with the thalamus, a functionally, genetically and developmentally very different structure? Does the classic concept of

“diencephalon” make sense, or should the hypothalamus be separated? Does the preoptic area belong to the hypothalamus or the telencephalon? The answer to these questions in the context of recent causal molecular analysis will help to understand hypothalamic evolution and morphogenesis as well as its adult function and connectivity. In this Research Topic we have reviewed the fundamentals of hypothalamic ontogenesis and evolution, summarizing present-day knowledge, taking stock of the latest advances, and anticipating future challenges.

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