Structure and biological activity of gonadotropin-releasing hormone isoforms isolated from rat and hamster brains.

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Rat and hamster brain tissues were used to investigate the possible existence of a follicle stimulating hormone (FSH)-releasing factor with similar characteristics to the lamprey gonadotropin-releasing hormone III (lGnRH-III) form proposed in previous reports. The present studies involved isolation and purification of the molecule by high-performance liquid chromatography (HPLC), identification by radioimmunoassay, sequence analysis by automated Edman degradation, mass spectrometry and examination of biological activity. Hypothalamic extracts from both species contained an HPLC fraction that was immunoreactive to GnRH and coeluted with lGnRH-III and 9-hydroxyproline mGnRH ([Hyp(9)]GnRH). Determination of primary structure from purified total brain material demonstrated that the isolated molecule was [Hyp(9)]GnRH. This is the first report showing the presence of the posttranslationally modified form already known as [Hyp(9)]GnRH by primary sequence analysis. The biological activity of distinct GnRH peptides was also tested in vitro for gonadotropin release using rat pituitary primary cell cultures. The results showed that [Hyp(9)]GnRH stimulated both luteinizing hormone and FSH release, as already reported, whereas lGnRH-III had no action on the secretion of either gonadotropin.