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Structural and functional diversity of nonapeptide hormones from an evolutionary perspective: a review

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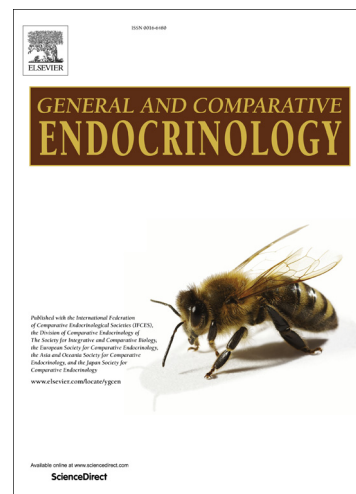
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1 **Structural and functional diversity of nonapeptide hormones from an evolutionary**  
2 **perspective: a review**

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9 **Abstract**

10 The article presents an overview of the comparative distribution, structure and functions of  
11 the nonapeptide hormones in chordates and non chordates. The review begins with a  
12 historical preview of the advent of the concept of neurosecretion and birth of neuroendocrine  
13 science, pioneered by the works of E. Scharer and W. Bargmann. The sections which follow  
14 discuss different vertebrate nonapeptides, their distribution, comparison, precursor gene  
15 structures and processing, highlighting the major differences in these aspects amidst the  
16 conserved features across vertebrates. The vast literature on the anatomical characteristics of  
17 the nonapeptide secreting nuclei in the brain and their projections was briefly reviewed in a  
18 comparative framework. Recent knowledge on the nonapeptide hormone receptors and their  
19 intracellular signaling pathways is discussed and few grey areas which require deeper studies  
20 are identified. The sections on the functions and regulation of nonapeptides summarize the  
21 huge and ever increasing literature that is available in these areas. The nonapeptides emerge  
22 as key homeostatic molecules with complex regulation and several synergistic partners.  
23 Lastly, an update of the nonapeptides in non chordates with respect to distribution, site of  
24 synthesis, functions and receptors, dealt separately for each phylum, is presented. The non  
25 chordate nonapeptides share many similarities with their counterparts in vertebrates, pointing  
26 the system to have an ancient origin and to be an important substrate for changes during  
27 adaptive evolution. The article concludes projecting the nonapeptides as one of the very first  
28 common molecules of the primitive nervous and endocrine systems, which have been  
29 retained to maintain homeostatic functions in metazoans; some of which are conserved across  
30 the animal kingdom and some are specialized in a group/lineage-specific manner.

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