

The Research Process and Development Prospects of Comparative Endocrinology

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[Abstract] Comparative endocrinology is a new branch of animal science that studies the structure and function of the endocrine system of various animal groups in the animal kingdom and its evolutionary development. It has great theoretical significance and application value. In theory, comparative endocrinology not only studies the structure, function, and evolution of hormones produced by various animal groups from the perspective of phylogenetic evolution. Further verify and profoundly understand the development and evolution of the animal kingdom from low to high environmental conditions, and study the complex diversity of hormone structure and function in different animal groups from the perspective of biodiversity, which helps deep people master the basic characteristics and changes of various hormone structures and functions. In terms of application, many economically valuable hormones can be found in comparative endocrinology studies for agriculture, forestry, animal husbandry, aquaculture, animal resource conservation and development, and medical and health care.

[Keywords] Comparative endocrinology; Research process; Development prospects

1. Introduction

In recent years, comparative endocrinology research has made great progress in both breadth and depth, and the research subjects have involved hundreds of animals from the main groups of low to high. Comparative endocrinology research is increasingly deepened, benefiting to a large extent from the development of related disciplines such as human medicine and endocrine, biochemistry and molecular biology, whose basic theories, academic ideas and research methods are widely used and compared for the comparison of internal divisions.

2. The Research Process of Comparative Endocrinology

In the past few years, systematic research has been carried out on several aspects of comparative endocrinology: separation, purification and structural analysis of various animal hormones, distribution and localization of hormones in animals, regulation of hormone synthesis and release, the function and mechanism of hormones, isolation, purification, distribution and structural analysis of hormone receptors, and the cloning of hormone genes and regulation of expression, etc. At the same time, the production and application of some hormones and analogues have also been vigorously carried out. A number of hormones have been applied in agriculture, forestry, animal husbandry and aquaculture, with remarkable effects.

3. The Development Prospects of Comparative Endocrinology

Comparative endocrinology is linked and cross-fused with other related disciplines. In the 21st century, comparing the future development of endocrinology can be attributed to the following three aspects:

(1) The development of molecular biology provides a powerful means for understanding the structure and function of various animal hormones, neurotransmitters and endocrine factors. The level of endocrinology will be fully integrated into the molecular level by organ, tissue and cell levels, and molecular comparison endocrinology will be the mainstream of comparative endocrinology development.

(2) With the development of systematic zoology and biodiversity research, more and more animal species will be discovered on Earth, which will greatly expand the object of endocrinology research. It is expected that more new hormones and their molecular variants will be discovered in the future. Further deep understanding of the regularity of the relationship between the structure and function of various hormones in different stages of evolutionary history and different ecological environments, and the discovery and synthesis of more animal hormones useful to humans, widely used in economic construction and social life.

(3) With the deepening of hormone basic research and the continuous development and innovation of genetic engineering technology, genetic engineering research of hormones will be more active. More economically valuable animal hormones will be isolated and purified and introduced into prokaryotic or eukaryotic cells to obtain large amounts of recombinant hormones. The genetically modified animal testing technology will be further improved, and a number of new breeds of poultry and aquaculture that are resistant to disease, stress, rapid growth, strong fertility, good meat quality or other traits will be successfully cultivated.

4. How to Develop Comparative Endocrinology and Make Achievements

For the great development of life sciences in the 21st century, China's comparative endocrinology research is striving to build a high-level innovative research team. Targeting the frontiers of discipline development, systematically and in-depth research on important research areas or specific research objectives, striving to catch up with the international advanced level and making significant achievements in production and application. We should work harder on the following five aspects:

- (1) Strengthen basic research and applied basic research, and select a number of topics that can give full play to China's characteristics, and have significant theoretical value and application prospects, such as hormone research related to the reproduction, growth and development of insects, amphioxus, fish, and mammals, and these topics are used as the main direction of the subject in a certain period of time, and a strong research team is organized to improve the academic level and solve practical application problems.
- (2) Actively introduce and develop new theories, new technologies, and new methods to promote cross-infiltration of related disciplines such as biochemistry and molecular biology. Strengthen the collaborative innovation of adjacent disciplines such as reproductive biology, developmental biology, and cell biology to track the direction of endocrine development.
- (3) Take active and effective measures to vigorously cultivate innovative young and middle-aged academic leaders and establish a stable high-level research team as soon as possible.
- (4) Increase investment in research funds from multiple channels, focus on and steadily increase the intensity of funding; strengthen the guidance and organization and management of key funding issues, and give full play to the practical benefits of limited funds in producing results and talents.
- (5) Strengthen international academic exchanges and cooperation, and cooperate with international peers on major frontier issues as much as possible to quickly narrow the gap and make up for the shortcomings of our research foundation. Actively participate in important international academic conferences, keep abreast of international information and developments, and master the frontiers and development directions of this discipline.