

No.	Symposium Title	Organizers	Summary
1	From Teleosts to Mammals: Diverse Hypothalamic Mechanisms Driving Reproduction in Vertebrates	Shinji Kanda (Japan) Naoko Inoue (Japan)	The symposium will focus on the central mechanism underlying animal reproduction with a comparative aspect. Although gonads are generally regulated by gonadotropins released from the pituitary, recent studies identified distinct key regulators in two model groups of species, mammals and teleosts (e.g. kisspeptin, GnRH/LH-RH, cholecystokinin/FSH-RH). In addition, reproduction is also modulated by various physiological status (aging, nutritional status, etc.), and these modulations are recently suggested to be induced by hypothalamic neurons. The speakers are going to make presentations on the hypothalamic mechanism controlling follicular development, ovulation, estrous cycles and reproduction-related behavior in mammals and teleosts. By inviting four speakers of different areas of the reproductive biology, the symposium covers not only physiological mechanism but also evolution of reproduction.
2	How the Placenta, Extraembryonic Membranes, and Host Microbiomes Program Neurobehavioral Responses in Comparative Animal Models	Helen Jones (USA) Cheryl Rosenfeld (USA)	This session will delve into how comparative animal models, including guinea pigs and rodents how the brain is shaped by extrinsic influences, including the placenta and gut microbiome. While transient, the placenta is essential for exchange of nutrients, gasses, and waste between mother and fetus. Further, it is increasingly becoming apparent that factors produced by the placenta can dramatically influence fetal brain development. Other extraembryonic membranes also appear to be influential during this period. The gut microbiota of the neonate can be acquired through the maternal vaginal microbiome in the case of natural deliveries and the skin microbiome for infants delivered by cesarean section. Changes in the resident maternal microbiomes can thus be transmitted to the newborns and lead to longstanding health effects. The American Poet Walt Whitman's verse "I am large, I contain multitudes" summarizes the relationships that exists between how the collective bacteria harbored within an animal drives host responses, including those of the central nervous system. Greater than 10,000 different bacteria species have been identified in the human body, and their collective genes outcomes ours at a ratio of 100:1 (3.3 million to 22,000). Over 90% of diseases, including cardiovascular, metabolic, immunological, reproductive, and neurobehavioral disorders, are postulated to trace their origins back to disruptions in the gut microbiota, otherwise called gut dysbiosis. Numerous studies support the existence of a gut-microbiome-brain axis. Thus, this session will also consider how changes in gut microbiota might affect neurobehavioral responses in comparative animal models.
3	Stress Axis I (Morning session): From Origins to Implications of Actions	Robert M. Dores (USA) Mathilakash M. Vijayan (Canada) Ciaran Shaughnessy (USA)	The morning session of this day-long symposium will begin with presentations on the origins of the "HPA/HPI" axis in chordates, and then move to the physiological roles of the HPI/A axis with a focus on evaluating new models to evaluate stress paradigms, and the implications of the activation of the stress axis on populations of vertebrates in their native environments.
4	New Frontiers for Comparative Endocrinology from Neuroendocrine Research	Yoichi Ueta (Japan) Ken-Ichi Matsuda (Japan) Takahiro Sato (Japan)	Neuroendocrine system involving the hypothalamic pituitary system is known to regulate the fundamental physiological functions such as development, growth, reproduction and stress responses. Peptides and neuro-steroids are abundant in neuroendocrine system of both invertebrates and vertebrates. This proposed symposium will focus on the hypothalamic pituitary function related to behavior and physiological roles of novel peptides/ neuro-steroids discovered from invertebrates and vertebrates.

5	New Frontier in the Regulation of Spermatogenesis by Hormones and Long Noncoding RNAs	Atsushi Kimura (Japan) Takashi Yazawa (Japan) Toshio Sekiguchi (Japan)	<p>Spermatogenesis is a common process to generate haploid sperms in vertebrates. It is regulated by complicated molecular mechanisms that are subject of ongoing studies. Gonadotropins are primary regulators in the progression of spermatogenesis, and many other hormones are also involved in the regulation. In addition to the hormonal control, various intracellular molecules play important roles in spermatogenesis, and long noncoding RNAs (lncRNAs) represent one of such regulators. Here, to discuss the recent progress of researches on the regulation of spermatogenesis, we invite each two of energetic researchers who study testicular hormones and lncRNAs, respectively. We hope this symposium provides an opportunity to consider the overall picture of regulation of spermatogenesis.</p>
6	Stress Axis II (Afternoon session): New Insights into the Molecular and Cellular Aspects of HPA/HPI Axis	Robert M. Dores (USA) Mathilakash M. Vijayan (Canada) Ciaran Shaughnessy (USA)	<p>The afternoon session of this symposium will focus on the molecular and cellular properties of the Corticosteroid receptor, the ACTH receptor (melanocortin-2 receptor), the hypophysiotropic factor (i.e., CRF) with a focus on the genetic manipulation, molecular modeling, and mode of action of these molecular components of the HPI/A axis.</p>
7	New Advances of Tissue Imaging in Endocrinology	Takashi Suzuki (Japan)	<p>It is well known that hormones immensely contribute to not only normal tissue/cell functions but also development of various disorders. Hormones are secreted from the endocrine organs, transported, and act on their target tissues. Since hormone action is such dynamic, it is difficult to precisely understand its biological significance in the tissue specimen. However, in recent years, new visualizing techniques have been developed, and new light is being shed on hormonal effects in normal and pathological conditions. This symposium will highlight advances in imaging in various tissues, such as plants, animals and human, and provide up-dated and multi-disciplinary knowledge of this important field to the members of ICCE.</p>
8	Endocrinology of Non-model Organisms	Deborah Power (Portugal) João Cardoso (Portugal)	<p>The diversity of form and function of organisms is matched by variability in regulatory processes that are pivotal for homeostasis and survival. This makes studying non-model organisms of increasing importance as they can inform us about the role of regulatory processes in evolution, physiology and the factors that drive niche adaptation in the environment nature and other adaptation of animals to their environment, including unique lifecycles and their plasticity in the face of challenges. The accessibility of new technologies and high throughput molecular approaches is revolutionizing biology and the adoption of non-model organisms is accelerating the pace of discovery and permitting new paradigms to be challenged has increased with unique but insightful non model organisms has increased with the ease of access to, which are understanding of models present session will cross are increasingly important</p> <p>The advent of NGS and machine learning algorithms are revolutionizing our understanding on the evolution and function of the endocrine system. These technologies have facilitated the discovery of molecules that descend from lineage or species-specific events and enable the identification of novel interactive ligand-receptor partners and signaling pathways. This symposium will present the state-of-the-art about evolution and screening for functional of peptide ligands and their receptors in modulating the physiology of non-model organisms from invertebrates and vertebrates. We will invite experienced as well young researchers that have recently contributed to the discovery of novel endocrine systems (hormones and receptors) in the Animal Kingdom and their physiological significance and potential applications.</p>

9	Evolutionary Perspectives on the Hormonal Control of Osmoregulation in Vertebrates	Jason Breves (USA) Andre P. Seale (USA)	<p>Osmoregulation is fundamental to all life on earth. Among vertebrates, hormones play essential roles in maintaining ion and water homeostasis through their regulation of adaptive osmoregulatory processes. This symposium will bring together leading figures in this active field with the goal to synthesize and integrate the newest findings on the hormonal control of osmoregulation in vertebrates. By adopting evolutionary and comparative perspectives, we seek to understand the selection pressures driving the evolution, conservation, and divergence of vertebrate osmoregulatory strategies. Importantly, this symposium will facilitate conversations and discourse that identify gaps in our collective knowledge and enable future discoveries.</p>
10	Hormonal Control of Vertebrate Development	Yun-Bo Shi (USA)	<p>Nuclear hormones play complex and evolutionally conserved roles during vertebrate development. This symposium will present studies in two aquatic models: <i>Xenopus</i> and zebrafish, to highlight the distinct roles of different nuclear hormones in controlling various stages of vertebrate development. These include the control of germ cell migration and ovarian development by progestin, the very beginning of development, and the effects of thyroid hormone and glucocorticoid on postembryonic development, a period when adult organ/tissue formation takes place. The approaches and findings to be presented in the symposium will showcase state-of-the-art technologies for comparative studies and also reveal the value of these aquatic models in understanding basic molecular mechanisms underlying human development and diseases.</p>
11	Current Trends in the Endocrine Regulation of Feeding, Metabolism and Growth	Unniappan Suraj (Canada) Munetaka Shimizu (Japan) Joaquim Gutierrez (Spain)	<p>Several endocrine and neural factors are involved in the regulation of feeding and maintenance of energy balance, processes that are important for growth. This session will focus on cutting-edge research on the endocrine regulation of appetite, metabolism and growth in animals. The topics covered will also include development, nutrition and gut microbiome. Speakers using model or non-model organisms spanning invertebrates to mammals, and cutting-edge techniques, will discuss most recent advances in the comparative endocrinology of metabolism and growth. We envision a calibrated set of talks that will address sex, circadian patterns, and other important parameters in studying hormones and metabolism and growth. This symposium will serve as an important forum, especially for junior researchers and trainees, to discuss the most recent advances in the field.</p>
12	Phylogeny and Ontogeny of the Renin–Angiotensin System and Its Clinical Impact	Hiroko Nishimura (USA) Maria L. S. Sequeira-Lopez (USA)	<p>The renin–angiotensin system (RAS) evolved at an early stage of vertebrate evolution and remains functioning throughout the vertebrate phylogeny by adapting to various environments. The RAS is crucial for the regulation of blood pressure and fluid electrolyte homeostasis. The RAS is also expressed during early ontogeny in renal and extra-renal tissues, and it exerts unique functions in vascular growth and development. In this symposium, RAS experts (established and young) who use molecular biology/genetics and whole animal approaches discuss similarities and unique aspects of the RAS in these two time-dependent processes and debate their clinical correlations.</p>

13	New Insights into Acetylcholine Signaling Inside and Outside of the Nervous System	Toshio Takahashi (Japan) Koichiro Kawashima (Japan)	Acetylcholine (ACh) is regarded as a classical neurotransmitter that binds to nicotinic and muscarinic ACh receptors. Over the past few decades, a mounting body of evidence has shown that ACh and its receptors are also found in organs devoid of innervation and non-neuronal cells including epithelial and endothelial cells. It is now clear that ACh regulates a much wider range of physiological responses than previously appreciated, and that ACh can be produced by non-neuronal sources. In this symposium, we will present new insights into how ACh functions both inside and outside of the nervous system and how it contributes to new aspects in endocrine system.
14	Neuropeptides as Regulators of Social Behaviour	Ishwar Parhar (Malaysia) Tomoko Soga (Malaysia)	Neuropeptides in the central nervous system regulate multiple biological functions. Comparative studies have shown conserved or species-specific roles of neuropeptides in the evolution of social behaviours. For example, oxytocin (OT), the most well-studied neuropeptide, controls neuroendocrine system and social behaviour in vertebrates. OT and its receptors provide an interesting perspective on biochemical evolution and conserved social behaviours. On the other hand, Spxin (SPX), a novel neuropeptide, is evolutionally conserved across vertebrate species with some variations in teleost species. SPX1 and 2 act as neuromodulators with multiple central physiological roles in the regulation of feeding behaviour, emotional control and reproduction. This symposium will provide a comprehensive overview of the physiological roles of neuropeptides in the regulation of hormones and social behaviour in vertebrates.
15	Invertebrate Neuropeptides and Behaviours	Angela B. Lange (Canada) Ian Orchard (Canada)	There have been great advances in understanding neural circuits that use neuropeptides to control behaviours within insects and other invertebrates in this post-genomic era. This symposium will bring together researchers who have pioneered this research area in a variety of invertebrates including <i>C. elegans</i> , <i>Drosophila</i> , <i>Rhodnius prolixus</i> , crustaceans, etc.
16	Evolutionary Insights from Amphibian and Reptile Endocrinology and Neurobiology	Michihiko Ito (Japan)	This symposium, which is planned and proposed by ISAREN (International Symposium on Amphibian and Reptilian Endocrinology and Neurobiology), aims to present recent findings about amphibian and reptilian (neuro)endocrine systems in view of evolutionary insights, and to discuss not only molecular evolution such as genes and proteins, but also system evolution in vertebrates. The latter includes evolution of endocrine systems and evolutionary relationships between genomes and development/environments. In other words, the symposium could raise an importance of endocrine research in view of anamniote-to-amniote evolution and biodiversity.
17	Kobayashi Award and Encouragement Award of JSCE: Past Contributions and Future Directions in Comparative Endocrinology	Honoo Satake (Japan) Hironori Ando (Japan)	Since 2015, the Japan Society for Comparative Endocrinology (JSCE) has established the Kobayashi Award and the Young Investigator Award. The former is awarded to regular members of the society who have conducted valuable research in comparative endocrinology and whose achievements are particularly outstanding. The latter is awarded to active regular members who are vigorously pursuing research in comparative endocrinology and are strongly expected to contribute to its future development. In this symposium, several recipients of the Kobayashi Award and the Encouragement Award present their major work for which they were honored and the subsequent development of their research. This symposium will illustrate their contributions to comparative endocrinology and indicate future directions in extensive field of endocrinology.

18	New Insights into Neuropeptide Biology from Marine Invertebrates	Honoo Satake (Japan) Masatoshi Mita (Japan) Maurice R. Elphick (UK)	Over the past decade, there have been rapid advances in the molecular characterization of neuropeptides and their cognate receptors and determination of their common and unique biological functions in marine invertebrates, including urochordates, cephalochordates, echinoderms, molluscs, and annelids. This symposium will provide cutting-edge insights and perspectives on the neuropeptide biology of marine invertebrates via one state-of-the art lecture and three oral presentations. All of the speakers are leading researchers on the neurobiology, neuroendocrinology, and endocrinology of marine invertebrates and have published high-impact papers in this field.
19	Biological Clocks under Natural Environment	Tomoya Nakayama (Japan) Sakiko Shiga (Japan)	Organisms are exposed to cyclic environmental changes such as seasonal and lunar cycles. Adaptation to these environmental changes is essential for breeding success and survival of offsprings. At this symposium, we aim to promote our understanding of the mechanisms of seasonal and lunar clocks.
20	Recent Progress in Pacific Salmon Stock Enhancement: from a Perspective of Comparative Endocrinology	Arinume Munakata (Japan)	Recent advancements in salmon stock management and related biological studies are reviewed from a physiological perspective, with a particular focus on comparative endocrinology. Several processes, such as smoltification, osmoregulation, and stress responses, are involved in salmon stock management. Our goal is to examine recent progress in these areas to improve the production of high-quality salmon and enhance stock management in both rivers and seas.