Like many other fields in the life sciences, comparative endocrinology is enjoying dramatic progress thanks to the enormous quantities of data being generated with new methods in genetics and genomics. Comparative endocrinology already has a rich history of important findings made in animals that are rather distantly related from ourselves and in other mammals. For instance, the discovery of hormonal secretion from the nervous system, and not only from endocrine cells, was initially made in fish in the late 1920s and in a snail in the 1930s. Gradually it was accepted that mammalian neurons also release hormones such as oxytocin. A closer relative to ourselves, the cow, was the source when the oxytocin structure was first determined, a feat leading to the Nobel Prize in 1955, and pigs and sheep provided the starting material for so-called ‘releasing hormones’ extracted from the hypothalamus, rewarded with the Nobel Prize in 1977.

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Since then a long line of discoveries in a broad range of animal species have contributed to the progress in endocrinology, which has, of course, increased our understanding of human endocrinology. *Homo sapiens* is an important species in this field of research, because humans can provide detailed descriptions of the consequences of hormonal treatments as well as hormone deficiencies. In other words, comparative endocrinology and clinical endocrinology cross-fertilise one another very efficiently, leading to practical applications that are of mutual benefit for humans and animals.

In addition to medical use, both in healthy humans (for contraceptive purposes) and patients, hormones are key to the successful breeding of both domestic animals and fish. Hormone-like substances are being used to control pests feeding on crops, including insects such as locusts. Insects also have useful properties, and endocrine research is being conducted to improve silk farming. Perhaps insect endocrine research may contribute to making insects a food resource even for humans.

Another important aspect of comparative endocrinology is the influence of so-called ‘endocrine disruptors’ – compounds that interfere with reproduction, for instance. Some such substances occur naturally in plants, but a much greater problem is posed by leakage into the environment of hormones or hormone-like substances, primarily contraceptives, from humans and domestic animals. This can interfere with reproduction in wild animals such as fish by reducing fertility and distorting sex ratios.
New techniques in functional genomics and bioinformatics provide tools and approaches in comparative endocrinology that were unthinkable just a decade ago. Today the activity of the entire genome can be studied in a matter of weeks or months after treatment with a hormone or hormone blocker. The contrast with the Nobel Prize-winning achievements in the 1970s could not be more dramatic. Then, the hypothalamus was dissected from five million dead sheep to isolate and characterise a couple of hormones. Today, literally thousands of genes can be investigated in many organs after hormone treatment – in a single individual.

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Many comparative endocrinologists are already involved in efforts to find out more about the actions of hormones through functional genomics. This will involve extensive interactions between comparative endocrinologists and scientists in functional genomics and bioinformatics.

In the present era of genomics, an important task for the endocrine research field is to maintain a high level of expertise in experimental methods such as physiology and animal behaviour – and to be able to ask the most interesting scientific questions. Comparative endocrinology is a highly interdisciplinary field, involving not only many different types of organisms but also a wide range of methods for studies at different hierarchical levels, from molecular genetics to ethology and ecology. Functional genomics will provide important tools on all these levels.

Just as genomics is boosting endocrinology, the comparative approach already used for so long in this field is now becoming a crucial asset in many types of studies in the life sciences. Whenever a new component or mechanism is discovered, it is natural to explore how widespread it is in different life forms, how it arose in the first place and how it has changed in different lineages during evolution. Such information helps us understand how physiology works and how amenable different physiological processes may be to modification if we wish them to be enhanced or reduced.

Like so many other endeavours in science, comparative endocrinology is a highly international discipline, and a recent conference held in Zurich in August attracted participants from 34 countries. The European Society for Comparative Endocrinology (ESCE) is also working on initiatives to interact with scientific organisations in adjacent fields to further broaden the interface with other areas of research. One of the closest fields is neurobiology, since many substances function both as neurotransmitters and hormones.

However, the recession in Europe undoubtedly hampers scientists’ ability to interact and collaborate. Not only do shrinking budgets in many countries reduce the possibilities for scientists to make new discoveries, but participation in scientific conferences is also reduced. This is unfortunate, because scientific discussion is important to generate new ideas. On the bright side for the ESCE, the high numbers of new young members offer high hopes for the continued development of this field.

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