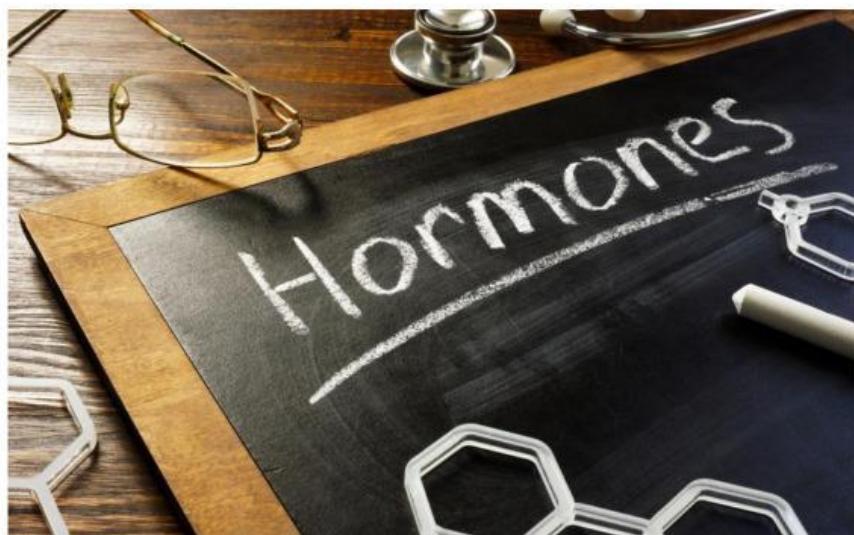


## HORMONES



### *Reading*

#### **Task 1. Read the text carefully.**

#### **The History of Hormone Research**

In June 1905, Ernest Starling, a professor of physiology at University College London, UK, first used the word 'hormone' in one of four Lectures delivered at the Royal College of Physicians in London. Starling defined the word, derived from the Greek meaning 'to arouse or excite', as "the chemical messengers which speeding from cell to cell along the bloodstream, may coordinate the activities and growth of different parts of the body". Starling was a brilliant experimentalist, and these prestigious lectures were in recognition of his work – much of it in collaboration with his brother-in-law William Bayliss on the effects of innervations and pancreatic secretion on the intestine.

Since Starling coined the word, the concept of hormones has spawned immense interest in a wide range of research fields, ranging from chemistry to molecular biology to epidemiology. In addition to purely scientific advances, the study of hormones has led to enormous benefits to human health, social and economic progress, such as contraception, in vitro fertilization (IVF) and recombinant human hormones. More recently, the topic of hormones and hormonally regulated metabolism and development has also found interest among public health experts and the larger public, after concerned scientists in the USA hypothesized that various man-made chemicals could interfere with the hormonal system to cause a wide range of diseases and disorders.

The nature and work of chemical messengers in the body had already attracted the interest of scientists before Starling. Experimental work by pioneers such as Arnold Adolphe Berthold in Germany and Claude Bernard in France, in the middle of the 19th century, established the concept that some sort of chemical communication takes place between different organs in an animal. Later in the same century, several physicians described the successful treatment of patients with certain disorders by

administering extracts of animal endocrine tissues, such as the thyroid, adrenal glands and pancreas; they subsequently showed that these disorders were due to hormonal deficiencies.

In the first half of the 20th century, researchers thus concentrated their efforts on identifying the source of these internal messengers, with the result that many hormones have been named after the gland or organ from which they are secreted, such as thyroid or adrenal. This system of nomenclature was not always perfect, because distinct hormones can be secreted by the same gland, as, for example, with the pituitary and the pancreas. Scientists also succeeded in deciphering the chemical nature of hormones and, less than 20 years after Starling coined the word 'hormone', Edward Calvin Kendall at the Mayo Clinic in Rochester, NY, USA, purified and determined the structure of cortisone (a steroid) and thyroxine (an iodoaminoacid). In 1926, Sir Charles R. Harington in London performed the first chemical synthesis of a hormone, thyroxine. His breakthrough work was soon followed by the characterization of the nature and activity of the pancreatic hormone insulin – a protein – by Sir Frederick Grant Banting and Charles Herbert Best.

In the 1920s and 1930s, Adolf Butenandt, Tadeus Reichstein and Edward Adelbert Doisy discovered and characterized various steroid hormones, including estrogen, testosterone and progesterone. Butenandt, Doisy, Kendall, Banting and Reichstein were all later awarded Nobel Prizes, which illustrates the growing importance of this emerging research field. This increasing knowledge of physiological actions also led to many hormones being named according to their actions, such as growth hormone and prolactin. However, this nomenclature can still be unsatisfactory as various hormones exert different actions in different target tissues or organisms at varying developmental stages.

**Task 2. Match the scientists with their achievements.**

Scientist	Achievement
1. Ernest Starling	A. purified cortisone
2. Edward Kendall	B. first synthesis of thyroxine
3. Charles Harington	C. coined the word "hormone"
4. Banting and Best	D. discovered estrogen, testosterone, progesterone
5. Butenandt, Reichstein, Doisy	E. characterized insulin

**Task 3. Choose the correct answer (A, B, C, or D) based on the text.**

1. According to Starling's definition, where do hormones travel?
  - Through the nervous system
  - Along the bloodstream
  - Through the lymphatic system
  - Through the digestive system

2. How did 19th-century physicians treat hormonal deficiencies?

- A) By using synthetic hormones
- B) By performing surgery
- C) By administering extracts of animal endocrine tissues
- D) By prescribing special diets

3. Why does the text say the naming system for hormones is "not always perfect"?

- A) Because different hormones can be secreted by the same gland
- B) Because scientists disagree on terminology
- C) Because hormone names are too long
- D) Because names change over time

4. According to the text, what concern do public health experts have about hormones?

- A) That natural hormones are becoming less effective
- B) That hormone research is too expensive
- C) That hormones are being overused in medicine
- D) That man-made chemicals might interfere with the hormonal system

5. What evidence does the text give to show the importance of hormone research?

- A) The number of research papers published
- B) The Nobel Prizes awarded to hormone researchers
- C) The amount of funding received
- D) The number of universities studying hormones

6. Which of the following is NOT mentioned as a benefit of hormone research?

- A) Contraception
- B) Treatment of diabetes
- C) In vitro fertilization
- D) Recombinant human hormones

7. From the text, we can infer that before Starling's work:

- A) Hormone research was considered unimportant
- B) Nobody knew that organs communicated with each other
- C) Scientists knew about chemical communication but had no specific term for the messengers

**D)** The word "hormone" existed but had a different meaning

**8.** The text suggests that the treatment of hormonal disorders in the 19th century:

- A)** Was completely ineffective
- B)** Was based on scientific understanding of hormone structures
- C)** Was rejected by most physicians
- D)** Worked even though scientists didn't fully understand why

**9.** We can infer that growth hormone and prolactin:

- A)** Were discovered before 1905
- B)** Are secreted by the same gland
- C)** Are named based on what they do rather than where they come from
- D)** Are steroid hormones

**10.** The text implies that the study of hormones:

- A)** Is a narrow field with limited applications
- B)** Has connections to many different scientific disciplines
- C)** Is only relevant to medical research
- D)** Has declined in importance since the 1930s

**Task 4. Complete the summary of the text using words from the box. There are MORE words than gaps.**

*actions, bloodstream, characterized, chemical, coined, coordinate, deficiencies, epidemiology, extracts, glands, interfere, Nobel, organs, synthesis*

The history of hormone research began in the 19th century when scientists established that 1) \_\_\_\_\_ communication occurs between different 2) \_\_\_\_\_ in an animal. In 1905, Ernest Starling 3) \_\_\_\_\_ the word "hormone" to describe messengers that travel through the 4) \_\_\_\_\_ to 5) \_\_\_\_\_ body activities.

Early physicians treated hormonal 6) \_\_\_\_\_ using 7) \_\_\_\_\_ from animal tissues. Later, Harington performed the first chemical 8) \_\_\_\_\_ of a hormone. Several researchers were awarded 9) \_\_\_\_\_ Prizes for their discoveries. Hormones can be named after the gland that secretes them or according to their 10) \_\_\_\_\_.

