

Declaration of Kyoto on Physiology Research

The Physiological Society of Japan

The history of physiology is paved with the efforts of our predecessors, who have endeavored to elucidate the structure and function of the human body since before the time of Christ. A modern approach to physiology, “homeostasis”, was proposed by Claude Bernard in the mid-19th century, and Walter Cannon championed it into the 20th century. Homeostasis refers to the maintenance of stability of the inner environment of the body against changes in the external environment. This is accomplished by a variety of physiological mechanisms including the circulation of fluids in bodily tissue. Even early on, the homeostatic approach bore fruit, such as the discovery of various hormones and autonomic reflexes in the 20th century. Since then, the field of physiology has progressed to smaller scales, reductively elucidating the molecular and cellular mechanisms of individual organs. This has resulted in our discoveries of the ion channels of excitable membranes, membrane receptor and transporters, the mechanisms of muscle contraction, and the structure and function of the nervous system. These advances in basic physiology have directly contributed to advances in medicine, benefiting the human condition by enabling increased longevity and health. The Physiological Society of Japan, established in 1922, has grown alongside this magnificent history of physiology and life sciences. Looking back over the last 100 years of physiology, we must pose the question: what should we expect of the next 100 years? An obvious next step is to integrate our modern understanding of individual organs, which we have gained over the last century, into a complete understanding of how these organs form the network which is the human body. This requires us to again reflect on the concept of homeostasis: if we can develop methods to maintain the *balance* between the body’s various functions, we can enable long and high-quality lives. But, considering the changes likely to occur over the next 100 years, even this may not be enough. The environment of our planet is worsening every day. Furthermore, the global Covid-19 pandemic, stretching from early 2020, has revealed a number of world-wide problems faced by society. To establish a sustainable and well-harmonized society, we must consider not only the homeostasis of individual humans, but also the homeostasis of human society and that of our planet and universe. We must not be complacent now that we have achieved longevity and health. We must establish a new philosophy and ethics on how to live and die, to guide us into the next 100 years.

We, the physiologists of the Physiological Society of Japan, make this declaration upon the 100th anniversary year of our society. We declare that we will conduct basic research and produce scientific evidence to achieve deep understanding of the homeostasis of the Earth and universe, and found the basis for a harmonious and sustainable community over the next 100 years.

March, 2023