Leo Loeb (1869-1959) [1]

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Leo Loeb [8] developed an experimental approach to studying cancer and pioneered techniques for tissue culture and in vitro tissue transplantation that impacted early-to-mid twentieth century experimental embryology [9]. Loeb received his medical degree from the University of Zurich [31] in 1897. As part of his thesis, he completed a thesis on the outcomes of tissue transplantation in guinea pigs. Loeb's work laid the foundational groundwork for the field of tissue culture, which has had profound implications for medicine and biology.

In 1889, Loeb began with experimental research on tissue culture and healing in guinea pigs. He further developed his research as a visiting scholar in the department of pathology at Johns Hopkins University School of Medicine [28], in Baltimore, Maryland, where he met Georgiana Sands, whom he married on 3 January 1922. In 1904, Loeb moved to St. Louis, Missouri, in order to become the director of research at Barnes Skin and Cancer Hospital [30]. He held this post until 1915, when he accepted the position of professor of comparative pathology at Washington University School of Medicine [30], in the same city.

Loeb's experiments focused on transplanting tumorous tissues. In 1901, Loeb published "On Transplantation of Tumors", where he hypothesized that tumor cells developed under certain conditions might be immortal like germ cells [4], the cells that are involved in reproduction. In this set of experiments, Loeb transplanted the same tumorous tissue throughout many consecutive generations of white rats. He observed that these somatic cells seemed to be able to outlast the life of the original organism because while the original source of the cells died, the tumorous cells could be reseeded for many different generations.

Loeb also worked on the origin of connective and normal cancerous tissue, and the body's reactions and healing processes after those transplantations. Loeb addressed these interests in his 1901 article, "On the Growth of Epithelium". This research focused on the wound healing process in guinea pigs. Second, he cut a piece of guinea pig's skin and placed it in a coagulated blood serum, then transplanted it into a live animal. From these experiments, Loeb concluded that individual epithelial cell masses continued to grow even when no connective tissue, in this case blood, was present. He proposed applying these methods to isolate other types of cells in order to study reactions of isolated tissue. This set of experiments helped to develop some of the earliest in vitro tissue transplantation techniques and demonstrate that tissue could be cultured.

In addition to tissue transplantation, Loeb also conducted research on the corpus luteum [33], a transient structure of theovary [34]. In 1906, Loeb published "The Formation of the Corpus Luteum in the Guinea Pig" in which he detailed his observations of guinea pig ovaries at consecutive time intervals after copulation. The purpose of his research was to determine what happened at each stage of corpus luteum, which he felt bore a strong resemblance to the processes seen in both wound healing and tumor growth. Loeb examined sixty ovaries from thirty guinea pigs by tissue transplantation techniques and demonstrated that tissue could be cultured.

Loeb received many awards throughout his lifetime for his research on cancer and healing. In 1935, he received the John Phillips Memorial Prize, a prize awarded annually by the American College of Physicians, for his research on the thyroid-stimulating hormone in the pituitary gland [35]. In the same year, Loeb's students at Washington University [35] in St. Louis established an annual fellowship in his name. In 1941, in recognition of his work on hormones and the aging process, he delivered a lecture at the Harvey Society [36] in New York, New York. The Harvey Society lecture series is a distinguished circuit in which each year seven of the nation's most prestigious scientists are asked to give a presentation. Loeb also received an honorary doctorate from Washington University [35] in St. Louis in 1948. In 1950, a special issue of the American Medical Association Archives of Pathology containing a list of 400 of his writings was dedicated to him. Loeb also served as a founder and member in many professional organizations, including president of the Association for Cancer Research in 1911, president of the American Association of Pathologists and Bacteriologists in 1914, and an officer and member of the National Academy of Sciences from 1937 until his death.

Loeb died on 28 December 1959 in St. Louis, Missouri. After his death, Ernest W. Goodpasture composed Loeb's memorial piece for the National Academy of Sciences [45]. According to Goodpasture, Loeb's work on tissue transplantation conceptually made possible in vitro culture of cells by developing techniques to grow cells without connective tissue.

Sources

pigs. Loeb's thesis inspired a life-long interest in tissue transplantation. His research culminated in greater than 400 publications, including a book called The Biological Basis of Individuality, in which he demonstrated the potential immortality of certain mammalian tissues.