Karl Oskar Illmensee (1939--) [1]

By: Lancaster, Cheryl


Illmensee was born in Lindau, Austria, in 1939. At the Ludwig Maximilians Universität in Munich, Germany, he studied chemistry and biology before beginning his PhD research in the Zoologisches Institut der Universität München, a zoology department of the Ludwig Maximilians Universität. Illmensee studied the developmental genetics of fruit flies. Two other researchers, Robert Briggs and Thomas King at the American Institute for Cancer Research [2] in Washington, USA, had cloned frogs in the 1950s. Illmensee attempted to use Briggs and King's method to clone fruit flies, but the results were not successful.

Despite failing to clone an adult fly, Illmensee published the results of his research in 1968. Illmensee exchanged the nucleus [7] of an unfertilized egg [8] with a nucleus [7] from a fertilized fly [4] egg [8], a process called nuclear transplantation. Of the 118 eggs that had undergone nuclear transplantation, 11 began to develop, and one developed into the larval stage, the stage high before adulthood in fruit flies. Illmensee had not cloned an adult fly, but he had created a clone that survived to the larval stage of development. He completed his PhD in 1972.

In the early 1970s, Illmensee traveled to the Institute for Cancer Research [4], which later became the Fox Chase Cancer Center, in Philadelphia, Pennsylvania. There, Illmensee worked with Beatrice Mintz [4] to manipulate mammalian eggs and develop techniques to use the eggs to create cloned embryos. Illmensee and Hoppe then developed the technique of using the cytoplasm of an egg to help grow a cell nucleus [8] into a complete embryo. Illmensee and Hoppe published their results, and the report attracted worldwide press attention.

In 1988, Illmensee left the Roscoe B. Jackson Memorial Laboratories in Bar Harbor, Maine. Shortly after, he moved to the University of Geneva [6], and became professor of molecular biology and biochemistry. Illmensee's research focused on mammalian reproduction, including the biochemistry of human eggs, and the development of organs in the embryos of mammals. Hoppe and Illmensee created hybrid cells, cells that contained genetic material from two different species. In 1982, Illmensee and Hoppe published their results, and the report attracted worldwide press attention.

In 1996, Illmensee became a professor of biological sciences at the University of Michigan in Ann Arbor. Illmensee continued to work in reproductive biology, and became involved in the cloning controversy of 1997. Illmensee defended his work, and stated that he had not cloned an adult fly, but had created a clone that survived to the larval stage of development. He completed his PhD in 1972.


In 1981, at the University of Geneva [6], Illmensee and Hoppe transplanted nuclei from embryonic mouse [6] cells into fertilized mouse [6] eggs that lacked a nucleus, a process called nuclear transfer. The eggs developed to the early blastocyst stage in the lab before being transferred to pseudopregnant female mice. Illmensee and Hoppe transplanted 179 developing eggs and recorded three live births. Later, those mice produced offspring that had traits and characteristics of the donor nuclei contained in the donated nucleus. Illmensee and Hoppe published their results, and the report attracted worldwide press attention.

During the 1990s, Illmensee studied mammalian reproduction, including the biochemistry of human eggs, and the development of organs in the mouse [6] embryo. In 1996, Illmensee became professor of reproductive medicine at the University Hospital of Innsbruck, Austria.


Illmensee attempted to use a technique called transgenic technology to create cloned embryos. In the technique, half of the cells from an early embryo were removed and grown in the lab to create two embryos from one. In 2006, Illmensee and Zavos published a paper on somatic cell nuclear transfer [2] (SCNT). SCNT involves removing a nucleus [7] from a cell, and inserting that nucleus [7] into another cell that has its original nucleus [7] removed. In their work, Illmensee and Zavos cultured cells from an infertile man in the lab. They fused Zavos’s sperm with cells that were grown in vitro from the man’s wife, and allowed the cell to develop in the lab. Once the egg [8] developed to the four-cell stage, Illmensee and Zavos transferred the early embryo to the uterus [21] of the woman, but the pregnancy did not proceed to term.


At the Genesis Fertility Center in Patras, Greece, Illmensee began working with Mike Levanduski. They also worked at American Fertility Services in New York City, New York. Illmensee and Levanduski studied embryo splitting, a process that can occur in pregnant women and results in identical twins. Levanduski and Illmensee caused human embryos to split in the laboratory, reporting their results in 2010. As the split human embryos progressed to a further stage of development, Levanduski and Illmensee suggested that embryo splitting might be useful for reproductive technologies (ART).

Illmensee continued to work at the Genesis Fertility Center in Patras, Greece, continuing his research on ART methods.

Sources

Karl Oskar Illmensee studied the cloning and reproduction of fruit flies, mice, and humans in the US and Europe during the twentieth and twenty-first centuries. Illmensee used nuclear transfer techniques to create identical twins.

I safety results of his experiments with cloned mouse embryos. Illmensee also worked with human embryos, investigating how embryos split to form identical twins. Illmensee faced accusations of fraud when others were unable to replicate the results of his experiments with cloned mouse embryos. Illmensee also worked with human embryos, investigating how embryos split to form identical twins.

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