

Rock-Menkin Experiments

Dr. John Rock, a doctor of obstetrics and gynecology in Boston, and Miriam Menkin, Rock's hired lab technician, were the first researchers to fertilize a human egg outside of a human body in February of 1944. Their work was published on 4 August 1944 in an issue of *Science* in an article entitled "In Vitro Fertilization and Cleavage of Human Ovarian Eggs." This experiment marked the first time in history that a human embryo was produced outside of the human body, proving that in vitro fertilization was possible in humans. The initial approach in the research was to see if experiments involving the fertilization of egg cells in rabbits and rats could be repeated with human egg cells. Based on previous experiments with other mammals, Rock and Menkin believed that the same could be done with human egg cells.

The research leading up to the successful experiment in 1944 consisted of six years of similar attempts with a number of variations in procedures along the way. The variations consisted of changing the conditions under which the extracted egg cells were stored, altering the duration of exposure to sperm cells in vitro, varying concentrations of both kinds of cells used, and other factors. The process of extracting the eggs from patients in the lab entailed the use of laparotomy around the tenth day of the menstrual cycle. The cells were then washed in Locke's solution and incubated for twenty-seven hours in a serum obtained from the patient who provided the eggs. After this incubation period, the egg cells were exposed to a sperm suspension also washed in Locke's solution for one hour. It was this exposure time that ended up being the key to successful fertilization. In previous unsuccessful attempts the eggs were not exposed to the sperm cells for an adequate amount of time and thus fertilization was not achieved. After being exposed to the sperm, the egg was transferred to a serum from a post-menopausal patient and observed over the following days. In the successful experiment, the eggs were fixed, stained, and photographed for documentation. After the incubation period, in two-cell and three-cell stages, it was clear that cell cleavage had begun, denoting the initial stages of embryonic growth and development and thus a successful fertilization. The cells were observed for a few more days but no attempt was made by Rock and Menkin to reintroduce the cells back into a woman in order to achieve pregnancy, as this was not the original goal of the experiment.

Based on the work of Dr. Rock and Miriam Menkin, the idea of in vitro fertilization was no longer limited to small animals like rabbits and rats. Their publication in *Science* caused quite a stir in the scientific community at the time and inspired many to begin working on further in vitro fertilization attempts. Dr. Landrum Shettles repeated their experiment years later in the preliminary attempts at a successful pregnancy from in vitro fertilization. Despite the absence of any pregnancies resulting from the embryos created in their experiments, Rock and Menkin still made their mark in the history of embryology, providing proof that an embryo could be created outside of a human body and demonstrating the ability to manipulate embryos as well as providing an important look into the very earliest stages of human life.

Sources

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2. "Artificial Fertilization." *The Science News Letter* 46 (1944): 99.

3. Rock, John, and Miriam F. Menkin. "In Vitro Fertilization and Cleavage of Human Ovarian Eggs." *Science* 100 (1944): 105-07.