**Rock-Menkin Experiments** [1]

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Keywords: Fertilization [2]

Dr. John Rock, a doctor of obstetrics and gynecology in Boston, and Miriam Menkin [4], Rock’s hired lab technician, were the first researchers to fertilize a human egg [5] 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* [6] fertilization [7] was possible in humans [8]. The initial approach in the research was to see if experiments involving the fertilization [7] of egg [5] cells in rabbits and rats could be repeated with human egg [5] cells. Based on previous experiments with other mammals, Rock and Menkin believed that the same could be done with human egg [5] 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 [5] cells were stored, altering the duration of exposure to sperm [9] cells *in vitro* [6], 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 [10] 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 [5] cells were exposed to a sperm [9] suspension also washed in Locke’s solution for one hour. It was this exposure time that ended up being the key to successful fertilization [7]. In previous unsuccessful attempts the eggs were not exposed to the sperm [9] cells for an adequate amount of time and thus fertilization [7] was not achieved. After being exposed to the sperm [9], the egg [5] 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 [11] had begun, denoting the initial stages of embryonic growth and development and thus a successful fertilization [7]. 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 [12], as this was not the original goal of the experiment.

Based on the work of Dr. Rock and Miriam Menkin [4], the idea of *in vitro* [6] fertilization [7] 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* [6] fertilization [7] attempts. Dr. Landrum Shettles repeated their experiment years later in the preliminary attempts at a successful pregnancy [12] from *in vitro* [6] fertilization [7]. 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 [13], 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.