

Rock-Menkin Experiments ^[1]

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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.