

Stage 1 One-celled Egg

1–20 Hours

Human equivalent
Horizon I, one-celled egg

Stage 1 begins with *fertilization*. It invariably occurs in the ampulla tubae, the dilated uppermost loop of the coiled oviduct (Fig. 1). *The eggs*, after ovulation, are in the metaphase stage of the second maturation division (Fig. 2). They are surrounded by follicle cells, which tend to clump together (Fig. 4). In each ampulla, there are 3 to 5 ova.

After 6 hours the eggs are still encircled by several layers of follicle cells. Sometimes these show mitotic cell divisions, side by side with pycnotic nuclei. Some ova are already fertilized. As an example, the specimen KT 980 contained 9 ova, of which 2 could definitely be regarded as fertilized. No first polar body was seen in any of these cells.

Evidently the first polar body soon becomes cytolized. After ovulation, it is usually no longer visible. However, it may persist in exceptional cases, for instance, as in specimen KT 791, a 2-celled egg of 24 hours.

After 10 hours the eggs are still located in the ampulla tubae. There are fewer follicle cells surrounding them, and many are pycnotic. The percentage of fertilized ova has considerably increased: for example, all of 8 egg cells in specimen KT 982 were fertilized, and all have emitted the second polar body (Fig. 5). All except one contained a male pronucleus (Fig. 6). Chang [11] observed that not even 50% of the eggs in this stage were fertilized.

After 20 hours all follicle cells have disappeared. The eggs are now located between the first and second loop of the oviduct (KT 972). The male pronucleus approaches the female pronucleus and starts mitosis (Figs. 7 and 8). The *zona pellucida* shrinks considerably after fixation in Bouin's solution, so that the overall diameter, in the fixed state, amounts to only 55 to 60 microns.

Overripe eggs are from time to time encountered in the oviduct (KT 995, KT 966). Within the first 10 hours after copulation, they can be easily recognized by the lack of surrounding follicle cells. In one case, a "nude" single egg contained 4 pronuclei of different sizes. Sometimes overripe eggs seem to initiate division, and they consist of several loosely adhering cells with only faintly staining nuclei. Similar degenerating blastomeres often occur in the ovary, within atretic follicles. They may arise by "spontaneous parthenogenesis." Artificial parthenogenesis has been described recently [15].

Material	Age	Content
KT 993/94	2 h	3 eggs in meiosis
KT 966	5 h	Degenerating eggs
KT 995	5 h	6 eggs, some degenerating
KT 979	6 h	Degenerating eggs
KT 980	6 h	9 eggs with female pronucleus, some fertilized
KT 981	10 h	8 eggs in second meiotic division
KT 971/72	20 h	8 eggs: one 2-celled, 1 triploid, 1 degenerating
KT 977/78	20 h	7 eggs: 6 definitely fertilized, with pronuclei and polocytes

Figs. 1–8: Beginning of development, first day

FIG. 1. Overall picture: ovary–oviduct–uterine horn.

A = ampulla tubae, *Cl* = freshly ruptured follicle, *I* = infundibulum, *O* = ostium uterinum tubae, projecting in uterine lumen.

KT 972. 22.5:1

FIG. 2. Tubal egg in second meiotic division, not fertilized, in ampulla.

KT 981. 720:1

FIG. 3. Spermatozoa, epididymal smear, iron-hematoxylin.

R = cytoplasmic droplet at end of mid piece. 1300:1

FIG. 4. Ampulla tubae with 2 fertilized eggs and surrounding follicle cells. 135:1

FIG. 5. Detail, showing sperm head under zona pellucida.

Opposite to it, *P* indicates polar body, in telophase.

KT 982, 10 h. 720:1

FIG. 6. Male and female pronucleus.

KT 982, 10 h. 720:1

FIG. 7. Male pronucleus approaches and starts mitosis.

Polar body *P* is detached.

KT 972, 20 h. 900:1

FIG. 8. Both nuclear membranes dissolved. Amphimixis.

KT 978, 20 h. 900:1

