

# poultry

## The Process of Egg Formation

By Mickey A. Latour, Ryan Meunier, and Jessica Stewart

The formation of an egg is a remarkable process that takes just over a day, from ovulation to oviposition. The reproductive tract begins with a mature ovum, which is a bare yolk and germinal disc, and constructs a hard shelled egg, complete with its own protective membranes and the necessary nutrients for the developing embryo. This publication will help you familiarize yourself with the process of formation and understand the function of various reproductive tract structures.

### Major Events in Egg Formation

Ovulation is the release of an ovum from a ruptured follicle. The ovum drops into the ovarian pocket and within a few minutes is captured by the infundibulum. Ovulation generally occurs about a half an hour after the previous egg has been laid.

Fertilization occurs in the infundibulum, which stores sperm for seven to fourteen days following insemination.

Formation occurs as the egg travels down the oviduct and is encased in the various layers that make up a chicken egg.

Oviposition is the laying of the egg. The uterus (or shell gland) contracts, forcing the egg out through the vent. Though the egg travels through the oviduct small end first, it is laid large end first.

### Egg Formation Timeline

The average time an ovum spends in each structure as it passes down the oviduct (from *Avian Physiology*; Sturkie, P.D.)

Infundibulum: \_ hour

Magnum: 2-3 hours

Isthmus: 1 \_ hour

Uterus: 20-26 hours

Vagina: just a few minutes

### Understanding Reproductive Tract Structures

**Ovary:** This organ produces mature ova from the supply of immature ova it contains. "Ova" is the plural form of "ovum" which is another word for "egg". When a hen reaches maturity, the ova begin to develop a few at a time, forming yellow, yolk-filled follicles.

**Oviduct:** This term refers the system that receives the ovum (or egg) from the ovary and produces an egg, which is then laid. About sixty-five centimeters long, the entire oviduct is actually one organ with many parts. (Note: The word ovum refers to the yolk and blastodisc formed in the ovary, not to the entire structure enclosed within the shell.)

**Immature Ova:** At any time, an ovary contains ova in various stages of development, ranging from very small, white ova, many of which will never be developed, to almost mature ova, ready to be ovulated.

**Follicle:** The follicle is a group of membranes containing the ovum. At ovulation, the follicle enclosing the ovum ruptures, dropping the ovum into the oviduct.

**Infundibulum:** This is a funnel-shaped structure at the top of the oviduct that captures a mature ovum shortly after ovulation. While in the infundibulum, the egg is fertilized if sperm is present and the first layer of albumen is deposited.

**Magnum:** This is a glandular structure made up of layers of circular muscles that carry the ovum along. It produces the majority of the albumen.

**Isthmus:** This structure produces and deposits the inner and outer shell membranes.

**Uterus (shell gland):** In the uterus, the egg acquires salt and water before calcification occurs, forming the calcium carbonate shell. The egg spends approximately 20 hours in this gland and acquires its color during the last 5 hours.

**Vagina:** The vagina carries the egg from the uterus to the cloaca.

**Cloaca:** The cloaca joins the reproductive tract to the digestive and urinary systems.

**Vent:** This opening serves both for egg laying and for excretion.

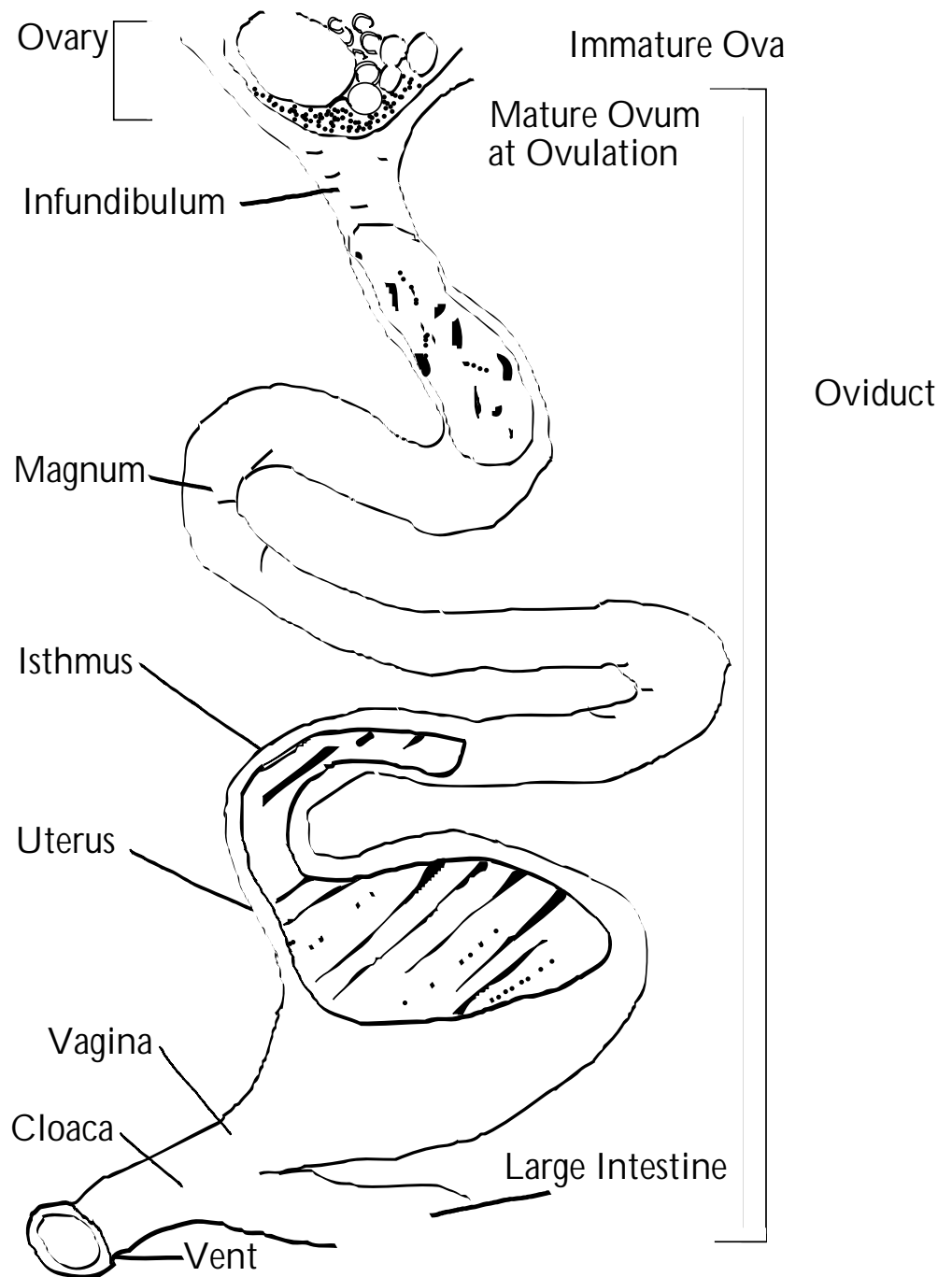
Have You Ever Wondered...  
 What causes blood spots in an egg? Occasionally, a capillary bursts near the egg sometime during ovulation or formation of an egg. This causes a small blood spot to appear. Though the industry takes steps to prevent eggs with blood spots from reaching the supermarket, occasionally blood spots are found in eggs. These eggs are completely safe for consumption.

Why are some eggs double-yolked? On occasion, two ova are released into the oviduct at the same time, creating an egg with two yolks. This is not an uncommon occurrence, especially in younger birds and birds who lay especially large eggs.

What's the difference between white eggs and brown eggs? The color of an eggshell is determined by the breed. White chickens lay white eggs and red chickens generally lay brown eggs. The color of the egg has no effect on flavor or nutritional content.

Why eggs come in different sizes? Beyond size variations caused by breed and environmental factors, the age of a hen affects egg size. Generally, older hens lay larger eggs. Eggs come in many sizes, from Jumbo to Peewee.

To test your knowledge of the reproductive tract of a laying hen, take the Oviduct anatomy quiz found online at <http://ag.ansc.purdue.edu/poultry/class.htm>



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