College of Veterinary Medicine
Department of Vet. Public Health

# Structure of Egg

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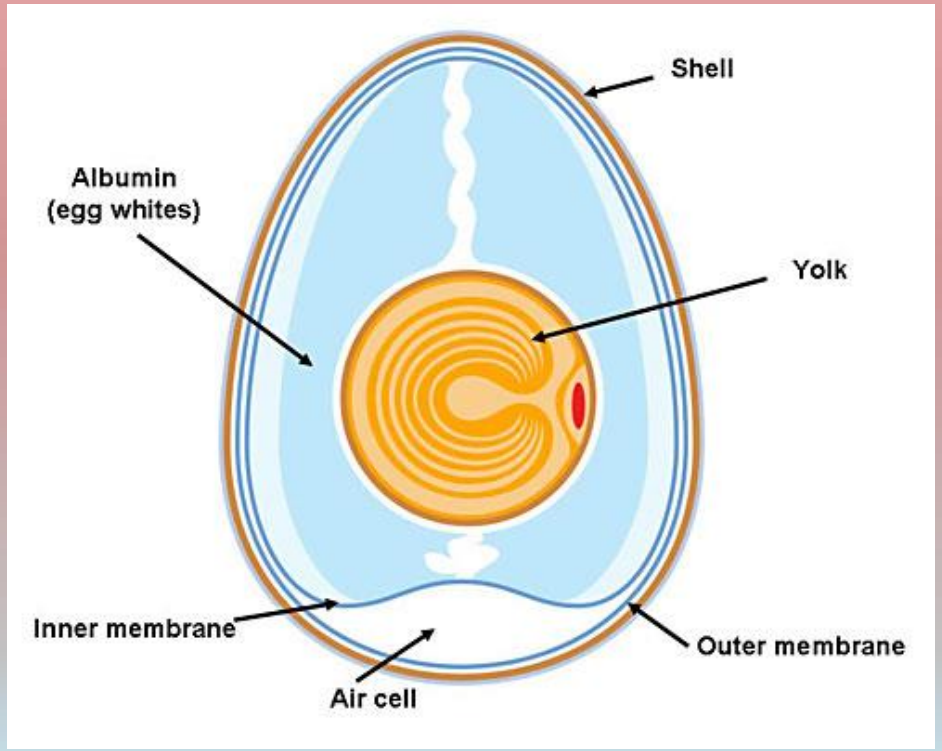
# Structure of Egg

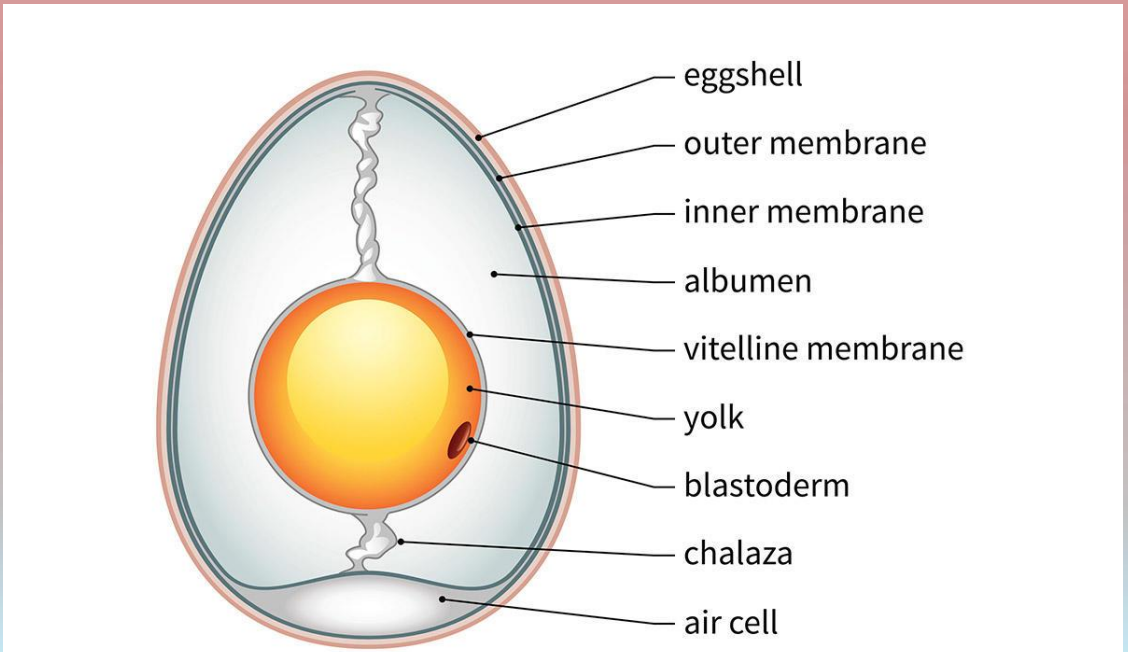
- The egg consists of :-

1) **yolk.**
2) **albumen or egg white.**
3) **shell membrane.**
4) **shell.**



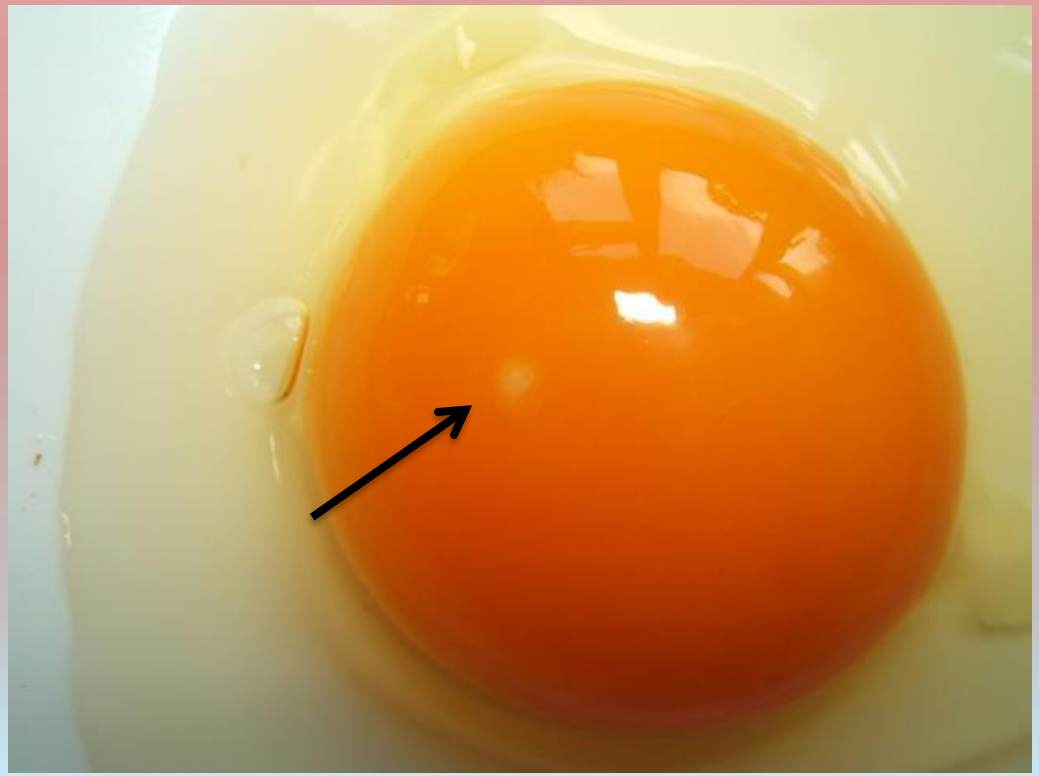
# 1) Yolk:

- ✓ A rounded yellowish colored material is present at the center of egg, it is called egg yolk and is enclosed by a thin membrane called **vitelline membrane** which is colorless.
- ✓ It accounts for about 31 % of the total egg weight.



# Germinal Disk:

- A small, circular, white spot (3-4mm) on the surface of the yolk, it's where the sperm enters the yolk, and it's called **blastoderm** in fertile egg and **blastodisc** in infertile egg.



# 2) Albumen or Egg White:

- ✓ The albumen accounts for about 58% of the total egg weight.
- ✓ The albumen consists of two layers:

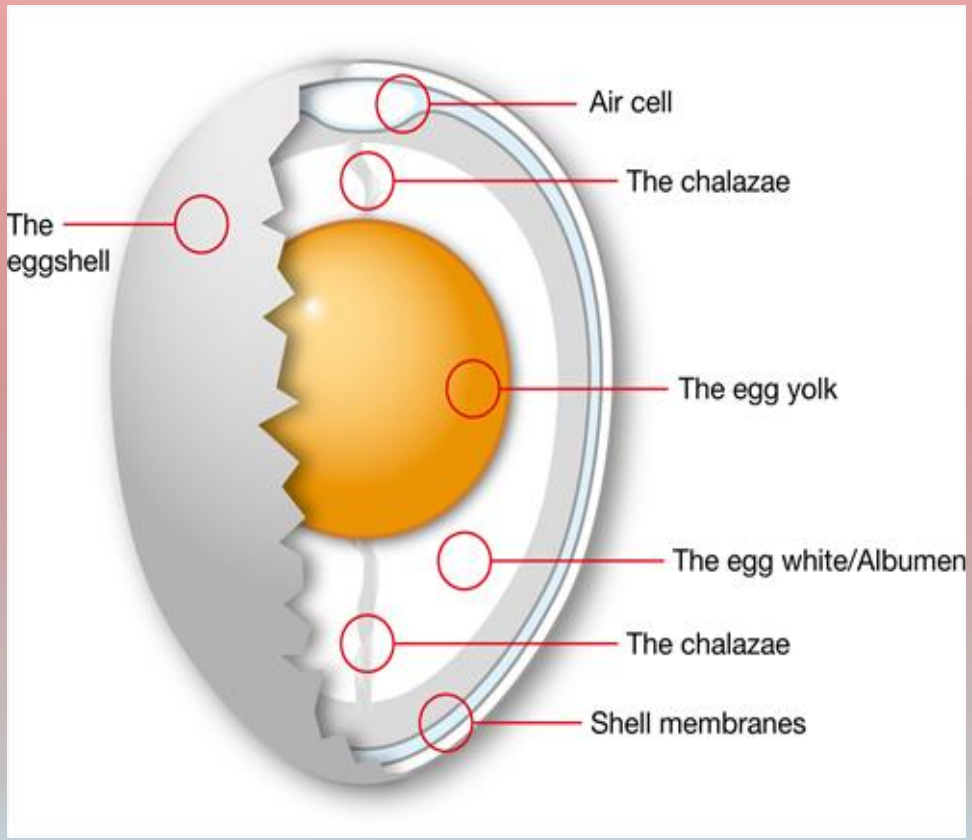
**a) outer thin white**.

**b) inner thick white.**

- ✓ The inner thick white layer of albumen is also known as (**chalaziferous layer**).
- ✓ Two thick spiral band are emerged from this layer, known as **chalazae**.

# Chalazae:

- Two thick spiral band are emerged from **chalaziferous layer**. They are joining the yolk to the ends of the shell to hold the yolk in the centre of the egg.
- Prominent chalazae indicate high quality egg (fresher the egg).



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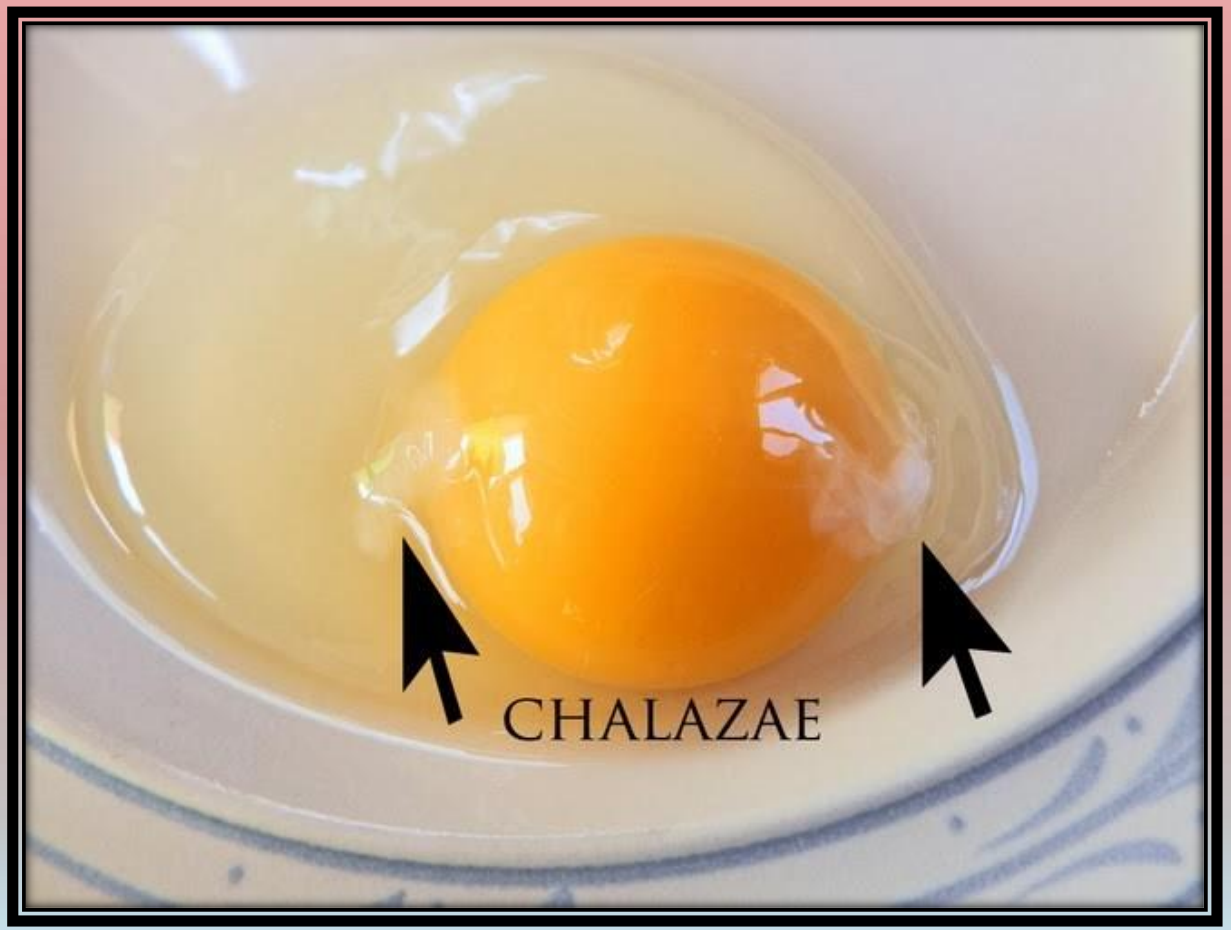
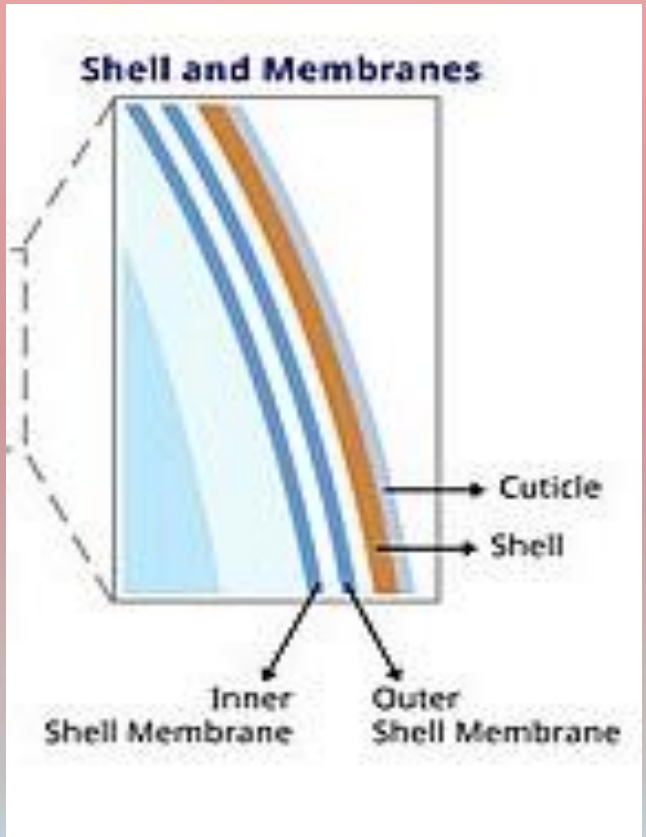


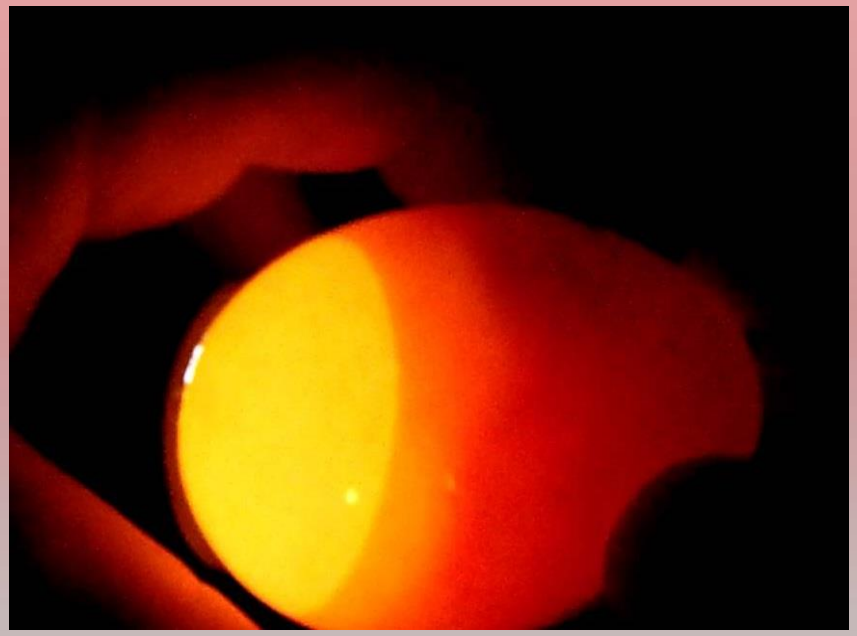
## 3) Shell Membrane

- ✓ two shell membranes **outer shell** membrane and **inner shell** membrane.
- ✓ They form a protective barrier against bacteria.
- ✓ The shell and shell membranes constitute about 11 % of total egg weight.



# Air Cell:

- It is the pocket of air formed at the large end of the egg. This is caused by the contraction of the contents on cooling after the egg is laid.
- The air cell increases with the age of the egg as there is considerable amount of moisture loss.



## 4) Egg Shell:

- ✓ It is the outer covering of the egg and is composed of calcium carbonate CaCo3 (94%), and (4%) protein and is covered with as many as 1700-7500 tiny pores on it which helps in gaseous exchange required for embryo development.
- ✓ The shell is covered by a thin transparent protein coating, called **cuticle**, It gives natural protection to the shell pores.

# Gross parts of egg of various poultry species

| Species | egg weight(g) | Yolk(%) | Albumen(%) | Shell & shell membranes (%) |
|---|---|---|---|---|
| Chicken | **58** | **31** | **58** | **11** |
| Duck | 70 | 35 | 53 | 12 |
| Quail | 10 | 32 | 48 | 20 |
| Turkey | 85 | 32 | 56 | 12 |

# Chemical Composition
# Nutritive Value of Egg

- Egg contains almost all nutrients in balanced proportion.
- Egg is rich in protein and low in caloric value.
- Egg protein is an excellent quality protein of high **biological value** and it is often used as a standard for measuring the quality of other food proteins.
- **B.V.** of egg protein is 95, milk protein 85 and meat protein 70.
- The high biological value of egg protein is due to its amino acid makeup. Most of the essential amino acids required by human beings are present in egg in balanced proportion.

# Chemical Composition
# Nutritive Value of Egg

- Almost all vitamins are present in eggs excepting vitamin C.
- The fat soluble vitamins(like A, D, E) are mainly concentrated in the yolk part.
- water soluble vitamins (mainly B2,B6, BI2 , pantothenic acid, niacin) are present both in the albumen and yolk parts of egg.
- Egg is very rich in vitamin D content.

# Chemical Composition
# Nutritive Value of Egg

- minerals like calcium, magnesium, potassium, sodium, chlorine, sulphur, zinc, copper and iodine are present in lesser extent.
- Egg is also known for its fatty acids. The saturated and unsaturated fatty acids and cholesterol are mainly present in the yolk portion of the egg.

**Chemical composition of egg of various poultry species (per 100g edible portion, without shell and shell membranes)**

| Species | Water (g) | Protein (g) | Fat (g) | Carbohydrate (g) | Mineral (g) | Energy (Kcal) |
|---|---|---|---|---|---|---|
| Chicken | **73.7** | **12.9** | **11.5** | **0.9** | **1.0** | **163** |
| Duck | 71.0 | 13.0 | 14.5 | 0.5 | 1.0 | 189 |
| Quail | 74.2 | 13.1 | 11.0 | 1.0 | 1.1 | 161 |
| Turkey | 72.6 | 13.1 | 11.8 | 1.7 | 0.8 | 170 |

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