Seed

- Final product of sexual reproduction.
- Fertilised Ovule.
  - → Seed coat
  - → Cotyledons (food reserves)
  - → Embryo axis

Mature seed

- Non-albuminous → no residual endosperm completely consumed
  eg. pea, groundnut, sunflower
- Albuminous → Retain endosperm not completely used by embryo.
  eg. wheat, maize, barley, castor.

Perisperm - residual persistant nucellus eg. black pepper & beet.

Integuments - tough protective

micropyle - small pore in seedcoat. (facilitate entry of oxygen & water)

parts of

2.4.3 Seed

In angiosperms, the seed is the final product of sexual reproduction. It is often described as a fertilised ovule. Seeds are formed inside fruits. A seed typically consists of seed coat(s), cotyledon(s) and an embryo axis. The cotyledons (Figure 2.15a) of the embryo are simple structures, generally thick and swollen due to storage of food reserves (as in legumes). Mature seeds may be **non-albuminous** or **albuminous**. Non-albuminous seeds have no residual endosperm as it is completely consumed during embryo development (e.g., pea, groundnut, sunflower). Albuminous seeds retain a part of endosperm as it is not completely used up during embryo development (e.g., wheat, maize, barley, castor). Occasionally, in some seeds such as black pepper and beet, remnants of nucellus are also persistent. (This residual, persistent nucellus is the **perisperm.**)

Integuments of ovules harden as tough protective seed coats (Figure 2.15a). The micropyle remains as a small pore in the seed coat. This facilitates entry of oxygen and water into the seed during germination. As the seed matures, its water content is reduced and seeds become relatively dry (10-15 per cent moisture by mass). The general metabolic activity of the embryo slows down. The embryo may enter a state of inactivity called **dormancy**, or if favourable conditions are available (adequate moisture, oxygen and suitable temperature), they germinate.

As ovules mature into seeds, the ovary develops into a fruit, i.e., the transformation of ovules into seeds and ovary into fruit proceeds simultaneously. The wall of the ovary develops into the wall of fruit called **pericarp**. The fruits may be fleshy as in guava, orange, mango, etc., or may be dry, as in groundnut, and mustard, etc. Many fruits have evolved mechanisms for dispersal of seeds. Recall the classification of fruits and their dispersal mechanisms that you have studied in an earlier class. *Is there any relationship between number of ovules in an ovary and the number of seeds present in a fruit?*

In most plants, by the time the fruit develops from the ovary, other floral parts degenerate and fall off. However, in a few species such as apple, strawberry, cashew, etc., the thalamus also contributes to fruit formation. Such fruits are called **false fruits** (Figure 2.15b). Most fruits however develop only from the ovary and are called **true fruits**. Although in most of the species, fruits are the results of fertilisation, there are a few species

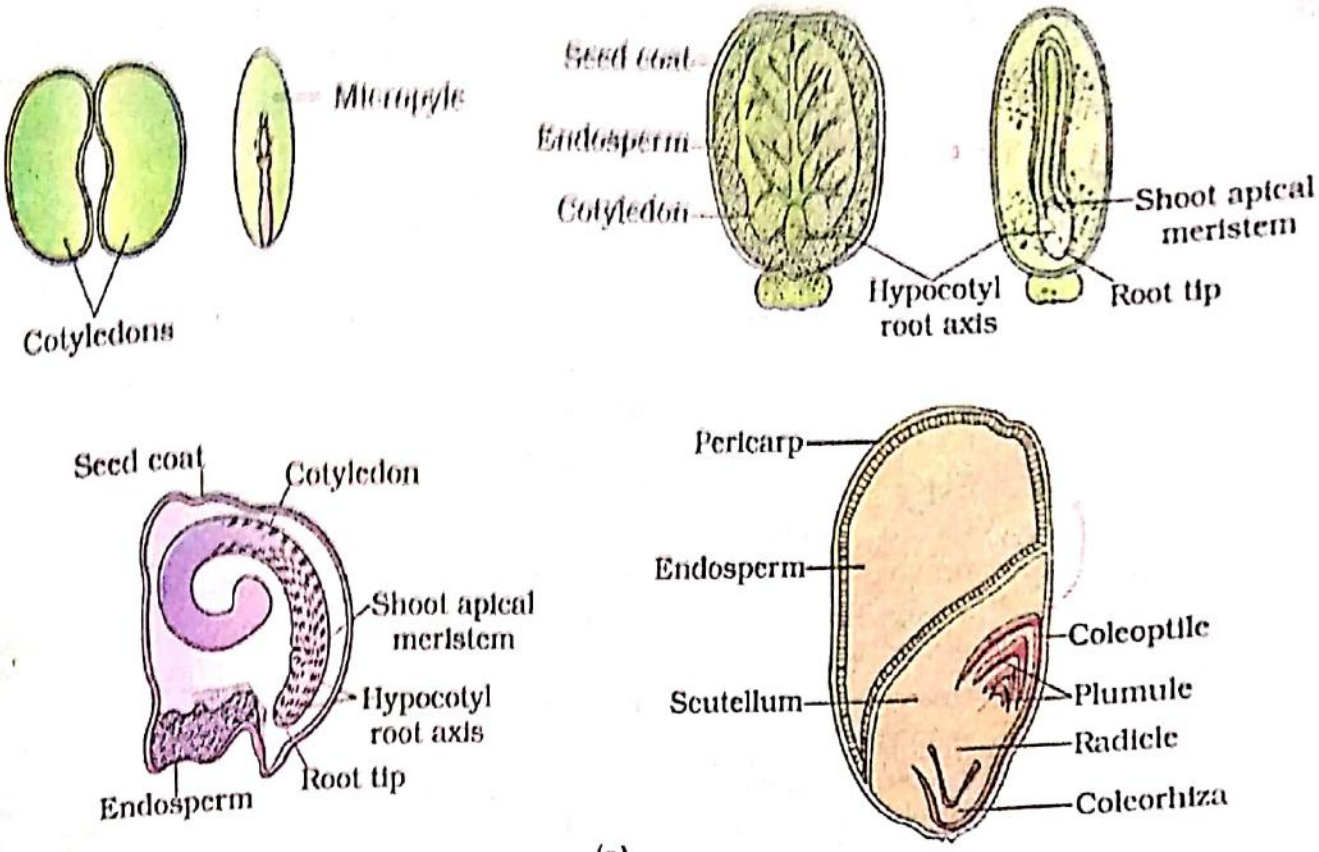

Figure 2.15 (a) Structure of some seeds. (b) False fruits of apple and strawberry

in which fruits develop without fertilisation. Such fruits are called **parthenocarpic fruits.** Banana is one such example. Parthenocarpy can be induced through the application of growth hormones and such fruits are seedless.