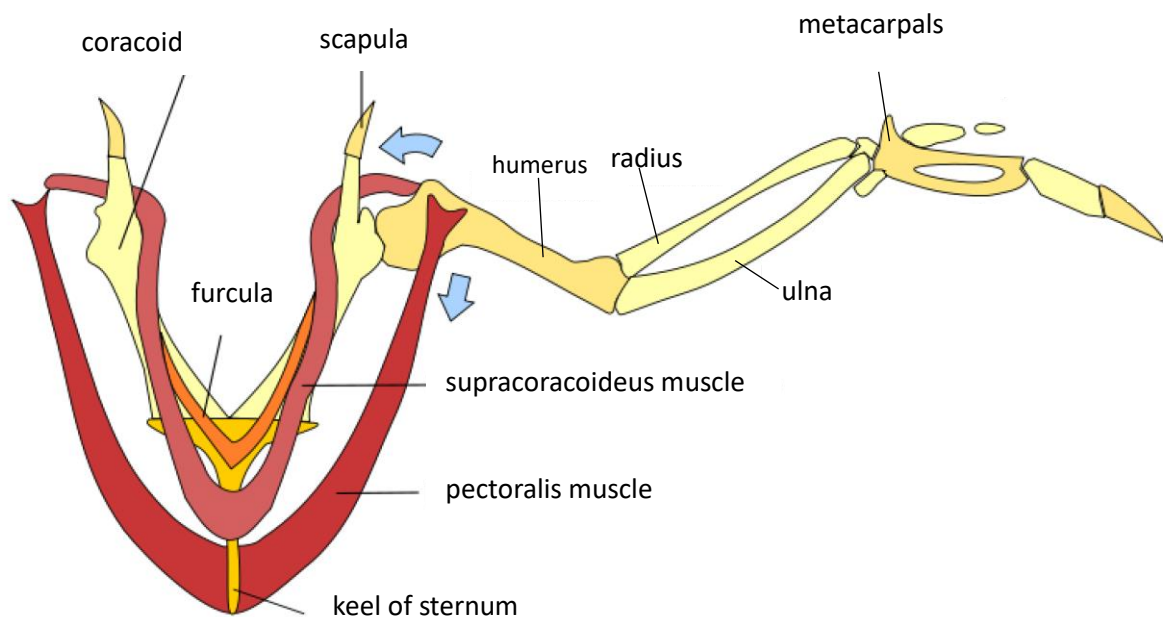


FLYING I.

Muscles in the service of flight

The most important muscles for moving the wings are the pectoralis muscle, which is the wing's descender, and the supracoracoideus muscle, which is the wing's lifter. The muscles attach to the fourchette and are located near the body's centre of gravity.

The smooth muscles of the skin include tiny feather-moving muscles. When these muscles contract, the feathers spread out.

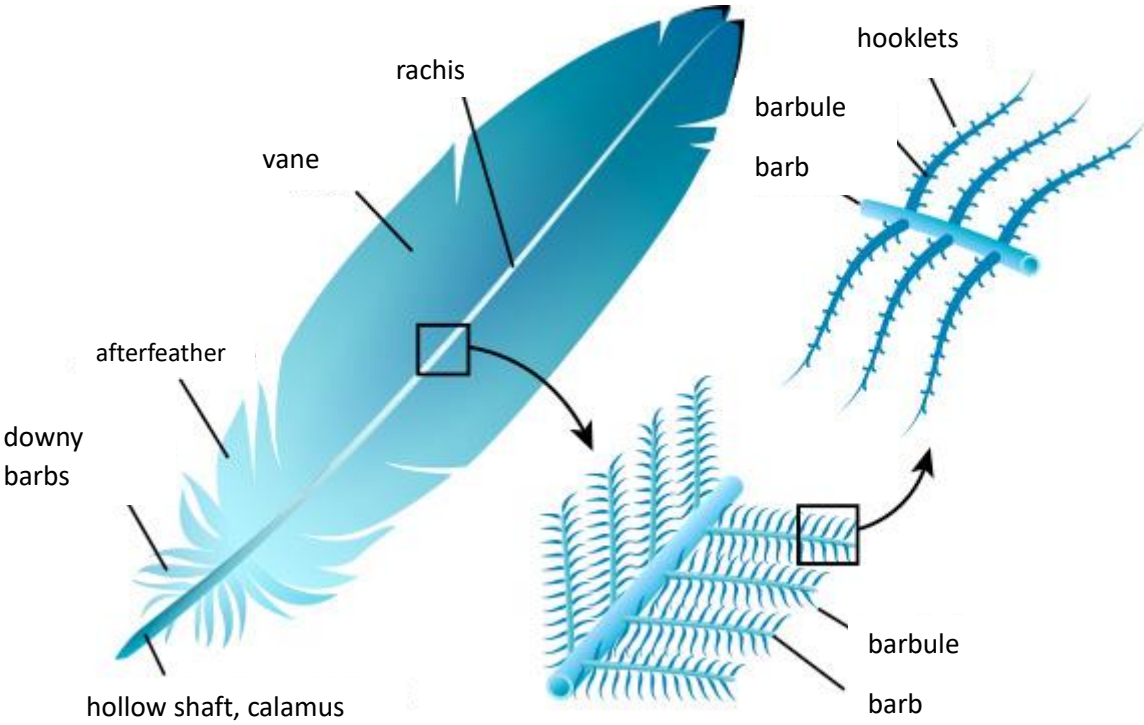


Source: https://en.m.wikipedia.org/wiki/File:Wing_Muscles,_color.svg

External covering in the service of flight

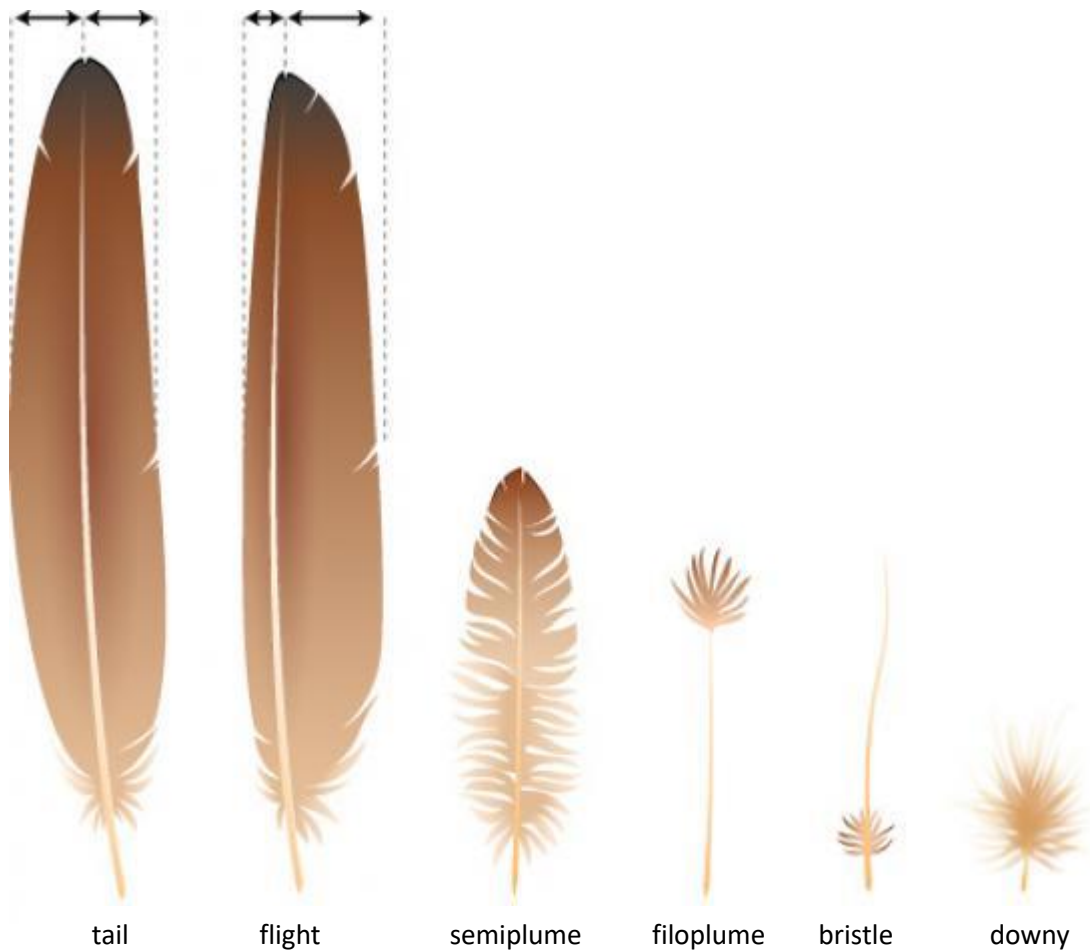
Unlike other vertebrates, birds have feathers covering their bodies. Feathers are a special type of horny matter that evolved before birds, before flight, as even the bird-ancestor dinosaurs had feathers. The plumage is the total set of feathers, which is characteristic of the sex and age of the bird. When young, birds are covered with floccus that are different in colour from those of the adult.

Feather anatomy



Source: <https://askbiologist.asu.edu/explore/feather-biology>

Types of feathers



Source: <https://tweez.com/article/Bird-Feathers>

Tail feather: resembles a fan. Its primary role is to steer the flying bird - hence the name "steering feathers". During the breeding season, many species have remarkably long and often specially shaped feathers to aid mate selection. These are dropped after the breeding season.

Flight feathers: are asymmetrical, which means that the outer vane, which is in direct contact with the air, is narrower, while the inner vane is much wider.

Body feathers: give shape and colour to the plumage. They are found everywhere except on the beak, foot and leg. They are coloured only at the ends and are down-like at the base, which helps to insulate the body.

Downy feathers: their role is to keep the bird warm.

Powder feathers: some birds, such as herons (Ardeidae), have special feathers that break down into a fine powder. This fine powder is spread all over the bird's body to act as a water repellent.

Semiplume feathers: unlike downy feathers, they have well-formed shafts and are not so soft. They are positioned below the filoplume. Their main role is to insulate the body.

The bristle feathers are very stiff, with only a few spines at the bottom. They are found around the mouth of insectivorous birds. They are also found around the eye, where their role is similar to that of the eyelids.