Among the histological elements of the Actinia we must finally mention the muscle cells, nerve cells, and reproductive cells; we shall merely discuss the two former here from a general point of view. The muscles originate either from the ectoderm or the endoderm, and usually continue to belong to both these epithelial layers. They consist of flat, fusiform, muscular fibrillæ, to one side of which the cell from which they were originally produced is attached. This latter is usually at the same time an epithelial cell, and with the fibre belonging to it represents an epithelio-muscular cell, or it is a cell lying in the deeper layers of the epithelium, and no longer extending as far as the surface, an epithelial cell, whose peripheral end has undergone retrograde formation, or a subepithelial muscle cell.

The principle of arrangement of the fibrillæ is the same in both cases; they are placed on the borders of the epithelium and the mesodermal connective substance, and form a thickly apposed simple layer, a muscular lamella. The muscles are not strengthened by the deposition of new layers of fibres, but by the "pleating" of the single-layered lamellæ. The underlying connective substance also comes into play, supporting all the folds of the muscular lamella by fine leaf-like processes (Pl. V. figs. 7–10; Pl. VI. figs. 4, 6).

The pleating of the epithelial, or subepithelial muscular lamella, becomes in many cases the starting-point for the development of a third form of the muscular fibres, the "mesodermal" fibres. When the surfaces of the supporting substance, which borders a muscular fold laterally, approach so that here and there they touch and become fused, the connection of the lower part of the pleating with the epithelium is dissolved, and it becomes completely enclosed in the mesoderm (Pl. VII. fig. 8). In this way are found in transverse sections, circular figures, whose periphery is occupied by the divided fibrillæ, whilst the centre contains the muscular corpuscles belonging to it. The transformation of the epithelial muscular elements into mesodermal can go so far that considerable masses of muscles lie in the mesoderm (Pl. IV. figs. 5–8; Pl. VI. figs. 1–3, 5).

In describing the muscles of the Actiniæ we must, therefore, be careful to note whether they are ectodermal, endodermal, or mesodermal, whether they extend simply in a smooth lamella, or are disposed in folds; as we shall see, they present in this way many characteristics of systematic value. This cannot be said of the nervous system, which I only go into here for the sake of completing my description. Nerve fibres and ganglion cells are found, in thoroughly examined Actiniæ, in nearly all the epithelial laminæ, where they form a layer between the bases of the epithelial cells. The layer is extremely thin in the ectoderm of the pedal disk, and usually also in that of the wall, whilst it is very strong in the ectoderm of the tentacles, of the oral disk and of the œsophagus. Nervous elements are usually less frequent in the endoderm, and only produce visible cords in the mesenteric filaments and acontia. We may lay down as a rule, that, where muscular filaments are present, the layer of nervous filaments lies over the former, and is most easily found in that place.