

TRAITE TECHNIQUE D'HISTOLOGIE

PARIS: SAVY, 1875, pp. 362-364

By Ranvier, L.

CARTILAGINOUS AND BONY TENDONS IN BIRDS

A cartilaginous tendon in the foot of a chicken, a turkey, or any other bird, possesses in the chondroid part parallel tendinous bundles like an ordinary tendon, and some series of cells which differ from the tendinous cells in that instead of being flat they are cylindrical or polyhedric. Furthermore, a homogenous, transparent, intercellular substance arranged in columns separates them from one another. This substance stains lightly with carmine, which distinguishes it from the substance of the cartilage. On transverse sections treated first with carmine and then with acetic acid, these cells appear as clear circles with a strongly coloured central nucleus, while the tendinous bundles are represented by unstained circles submerged in a red background.

In a partially calcified chondroid tendon, transverse sections made after initial decalcification with picric acid, coloured with carmine and treated with acetic acid, show several of the points described above; however the circles which represent the tendinous bundles are also coloured like the substance which separates them.

Lastly, fully ossified tendons, that is to say those tendons from which longitudinal and transverse sections, cut and polished on the grinding wheel, then mounted in Canada balsam, provide preparations similar to those from complete bony tissue. In them one can still recognise the structure of the tendon. For that, it is first necessary to decalcify in a solution of concentrated picric acid, then make transverse sections and stain with carmine; or else decalcify in a solution of chromic acid at 2 or 3 parts per 1000 and stain the sections in a solution of purpurin. One observes there the Haversian canals cut transversely, and around each one of these, if the preparation has been treated with carmine, a zone more coloured than the rest of the preparation, recalling the systems of lamellae, which, in long bones surround the vascular canals.

A deeper study, with a magnification of 150 to 400 diameters will make it clear that these are not true bony lamellae, and, even if the ossification is old, the bony substance around the vessels appears to be constituted, like in the rest of the tendon, by tendinous bundles which, on transverse sections, form so many circles. Only, in this case, they are much smaller and less distinct, although it should be still very easy to assess their limits.

This has already been very well described and figured by Lieberkhun¹.

It is clear that the ossified tendons of birds are formed by true osseous tissue, and that the basic bony substance is principally represented there by tendinous bundles which have been transformed, but are still recognisable. In a word, the ossified tendons of birds are nearly entirely made up of Sharpey's fibres (see page 308).

TENDONS IN POLARISED LIGHT

The study of these tendons in polarised light completes their demonstration. The longitudinal sections made at the grinding wheel and mounted in Canada balm were strongly birefringent, while the transverse sections prepared in the same way did not restore the light when the two prisms of Nicol were crossed. Around the vascular canals there was no trace of the luminous cross, which shows itself so sharply on the transverse sections of long bones.

To end this section on the tendons of birds, it remains to say that apart from the cartilaginous or ossified parts, these tendons possess the structure of the tendons of mammals. The flat cells there are very large, very numerous and have slender extensions which extend far from the tendinous bundles which they cover.

¹Lieberkuhn, 1860 Ueber die ossification der Sehnengewebes, Arch. Reichert et Du Bois-Reymond, p.824

Translation: Philip Adds, Queen Mary University of London 2001