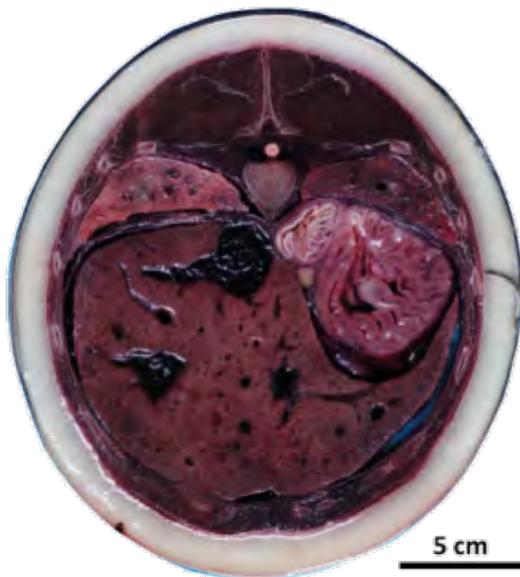


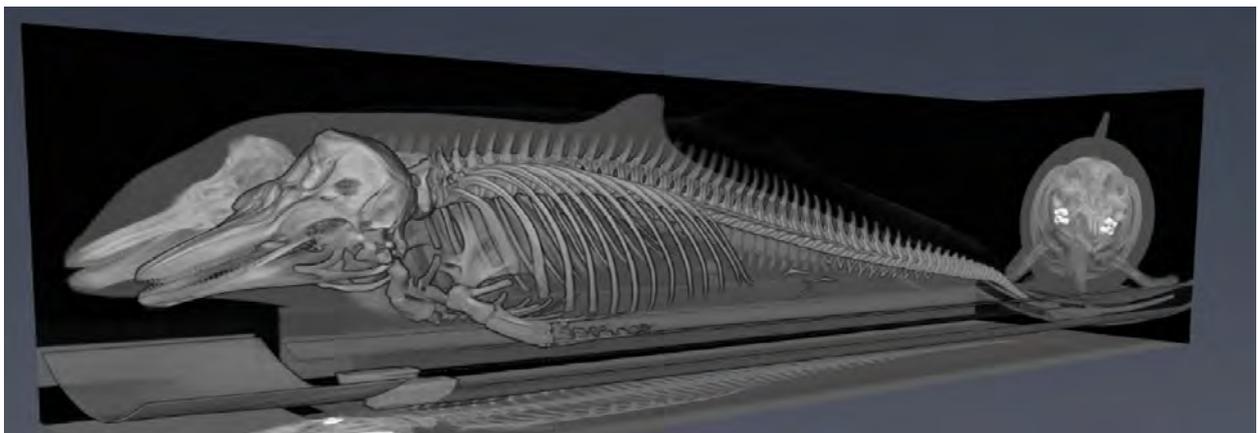
How to build a 3D harbour porpoise skeleton model

A harbour porpoise skeleton has first been investigated with computed tomography (CT) imaging systems. Different specimens were scanned at the Veterinary Institute of the University of Liège. Structure details were limited by the maximal resolution (isotropic voxel size: 600 μm) of the scanner (Scanner Siemens Somatom Sensation 16-slice, Siemens AG, München). Volume and surface rendering was performed with AMIRA 5.4.0 (VSG, FEI Company). Different computer assisting methods were then used to color the osseous structures and the skins.



This approach is completed by a second method. A previously frozen scanned specimen has been transversally cut in 81 slides being 15 mm wide with a band saw. Each slide has been photographed with a digital reflex camera. Each picture has a resolution of 7360 x 4912 pixels allowing the distinction of small anatomical structure. This will result in an anatomic atlas to use in parallel with the CT images.

A third and more experimental approach consists in the use of a MRI scanner in the University of Liège. The harbor porpoises we use for investigations are frozen, and we do not know the effect of this state on the tissue scanned with a MRI. To investigate this, we MRI scan individual fish in three states: freshly dead, frozen and unfrozen.



Information for teachers and educators:

1. The power point presentation allows a comparison between the dog (chosen because everyone knows it) and the porpoise skeleton. The comparison can also be used to explain the different characters related to the adaptation to marine life (modification of the skull, loss of the pelvic fins, modification of the pectoral fins with hyperphalangy and “untwist” of forearm, packing of the cervical vertebrae, etc.) The teacher should/could delete the parts that he estimates too complicated.
2. There is an interactive PDF available. It can be used by anyone having a computer (even without internet connection). The skeleton has been reconstructed on the basis of data for μ CT-scans. Some reliefs of the skeleton have been smoothed to avoid heavy computer files, but μ CT guarantees all the skeletal parts are correctly positioned and proportioned. On the PDF file, it is possible to use a tick box to highlight the main parts of the skeleton (skull, lower jaws, parts of the vertebral column, pectoral and pelvic girdles). It is also possible to use the mouse and a second tick box to navigate in the skull.
3. An online interactive version can be obtained at:
<https://sketchfab.com/models/c8736d3e96fc49c0a1b62cbe5c8805bc>

