

# BLOOD COLLECTION IN TURTLES



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**T**he diagnosis of health and disease is complicated in turtles when compared to other animal species; this is due to the presence of carapace and plastron, which make difficult simple procedures such as palpation, auscultation, radiography or ultrasound. Therefore, blood analysis can be a valuable non-invasive diagnostic tool in these animals. This article will review the most important points for collecting and handling chelonian blood samples.

## 1. VENIPUNCTURE SITES

Several venipuncture sites have been described in chelonians, and the selection of a specific one will depend on personal preferences, probability of obtaining hemodilution and size, sex and species of turtle/tortoise. In some cases, particularly with large animals, sedation will be necessary to exteriorize legs, tail of head in order to obtain a blood sample.



### DORSAL COCCYGEAL VEIN

Easier in males than in females, as males have longer and thicker tails. The tail is extended and the needle is inserted with a 45-90° angle in the dorsal midline, aiming to the coccygeal vertebrae. Once a vertebra is touched, start making negative pressure with the syringe while the needle is slowly pulled back until the vein is reached.



### SUBCARAPACIAL VEIN OR SINUS

Easy to find in many individuals, particularly those which retract the head inside the carapace. The needle is inserted in the midline area of the skin, dorsal to the neck and very close to the junction of the skin with the carapace, and directed dorsally, towards the junction between the cervical vertebrae and the interior aspect of the carapace.



### JUGULAR VEIN

Difficult to find in some species, particularly freshwater turtles. More appropriate in tortoises, although the vein is still difficult to notice or palpate. In some species there are dorsal and ventral jugular veins. The head is extended and the needle is inserted with a very low angle in the neck, at the level of a parallel line that includes the dorsal edge of the tympanic membrane (dorsal jugular vein) or the ventral edge of the tympanic membrane (ventral jugular vein). The carotid artery is associated with the jugular vein and when sampled (incidentally or purposely) the syringe fills quickly with bright red blood.



### OCCIPITAL SINUS

Located just caudal to the skull. The needle is directed ventrally, from the midline dorsal skin of the neck, with a 90° angle, right caudal to the occipital process. In species with long occipital process (freshwater turtles), the neck needs to be flexed and the needle is inserted caudal and ventral to the tip of the occipital process, and directed towards the tip of the nose.



### CEPHALIC VEIN

Difficult to find, particularly in animals < 1 kg. The anterior limb should be extended and the vein is located between the elbow joint and the prominent tendon that runs caudal to the joint.



### CERVICAL DORSAL SINUS

Commonly used in sea turtles. It is found dorsolateral in the neck, and in large animals can be up to 3 cm deep.

## 2. VOLUME COLLECTED

Four to eight percent of the body weight of a chelonian is blood, and 10% of total blood volume can be collected in a healthy animal. Therefore, a maximum of 4-8 mL of blood can be safely collected from a 1-kg animal.

## 3. ANTICOAGULANT

Heparin is the anticoagulant of choice, as EDTA can cause hemolysis in multiple species of turtles. The collection of even less than 0.5 mL of blood in heparin is enough to perform both a complete hematology and a biochemical panel using the ABAXIS Avian/Reptilian Profile Plus.

## 4. NEEDLE SIZE

Chelonian erythrocytes are large, up to 20  $\mu\text{m}$  in length (while mammalian erythrocytes are about 7  $\mu\text{m}$  in length). Therefore, care should be taken while collecting blood from a turtle to avoid cell rupture and consequent hemolysis (which leads to inaccurate hematologic and biochemical values). Blood should be collected avoiding very small needle size and avoiding excessive negative pressure applied to the plunger of the syringe.

## 5. HEMODILUTION

Blood collected from chelonians can be contaminated with lymph or extracellular fluid, producing abnormal results in hematology and biochemistry. Sometimes, just a clear fluid is obtained when attempting blood collection. Hemodiluted samples should be discarded and a new venipuncture attempt should be tried. Samples from the dorsal coccygeal vein and the subcarapacial vein result more easily in hemodilution.