

GAHP Recommended Cardiac Trimming Protocol for Pathologists

We are recommending one of two trimming protocols. The “basic” protocol provides an evaluation of the myocardium, valves and a limited evaluation of coronary vessels. In contrast, the “detailed” protocol provides the same evaluation as the basic but evaluates the conduction system as well as a more extensive evaluation of the myocardium and coronary vessels. Additionally, foramen ovale patency can be assessed. In cases with known conduction system abnormalities, it is highly recommended that the “detailed” protocol be followed as this will provide the most information possible. An excellent reference if assistance is needed is Sheppard MN. 2012. Approach to Cardiac Autopsy. J Clin Pathol 65: 484-95.

For inclusion in the GAHP database, please submit to gahpinfo@gmail.com the final electronic necropsy report, gross photos (see below) and a key so we can determine which slide number corresponds to which specific myocardial section (either as text within necropsy report, attached table or by labeling a photo of slab in sections similar to pg 2 of this guide).

Either the whole heart or sections of the heart may be submitted for evaluation. If the whole heart is submitted, then please follow the steps on page 4 for the following additional requested digital images and measurements be taken during prosection (see also check sheet):

Photographs:

- 4 Views: Anterior, Right, Posterior, Left **Photograph w/ ruler or size marker
- Heart base
- R AV valve
- L AV valve
- 3 (or 4 for gorillas) slab sections from apex
- Pulmonic valve
- Aortic valve

Measurements:

Heart weight _____ (g) Heart circumference _____ (cm)
R AV valve _____ (cm) Pulmonic valve _____ (cm)
L AV valve _____ (cm) Aortic valve _____ (cm)

Questions? Feel free to contact:

Dr. Rita McManamon (Orangutan SSP and GAHP lead Pathologist) ritamcm@uga.edu

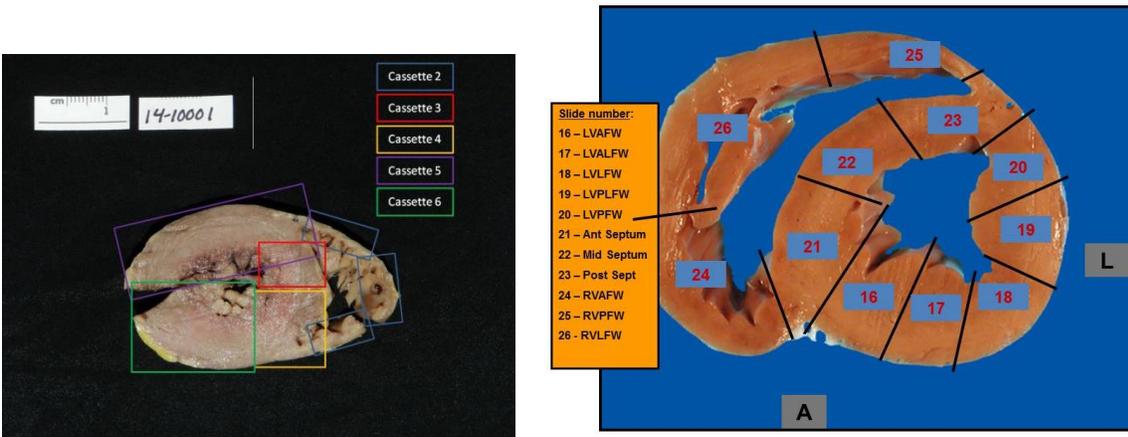
Dr. Linda Lowenstine (Gorilla SSP and Ape TAG Pathologist) lilowenstine@ucdavis.edu

Dr. Karen Terio (Chimpanzee SSP Pathologist) kterio@illinois.edu

Basic protocol:

Note: Cassette numbers are approximate and will vary based on the size of the heart, other cassettes trimmed for the case, and any lesions noted. All slides should be stained with HE. Additional specials may include: Masson's trichrome on sections of myocardium from slab section, PAS and Elastin on sections of aorta.

- Cassette 1: section right atrium-ventricle with R AV valve
- Cassettes 2-6: Section the myocardium from the entire 3 cm (bonobos, chimpanzees and orangutans) or 4cm (gorillas) slab section, please sample the following areas:



Example of “slab” sectioning from two hearts. The number of cassettes varies based on heart size but it is important to make sure to sample the entire slab “face” (from endocardium to epicardium). Do not put the entire 1 cm thickness into cassettes but trim to appropriate thickness for normal cassettes. Use the 3 or 4 cm face of the slab (not the 2cm side) for histology and place this side “down” in the cassettes. In other words, we should be able to put the slides together to recreate this gross image – just with an HE stain on it.

- Cassette 7: Left atrium-ventricle with L AV valve
- Cassette 8: Interventricular septum with aortic valve
- Cassette 9: Aorta
- Cassette 10-?: Other lesions

Detailed Protocol:

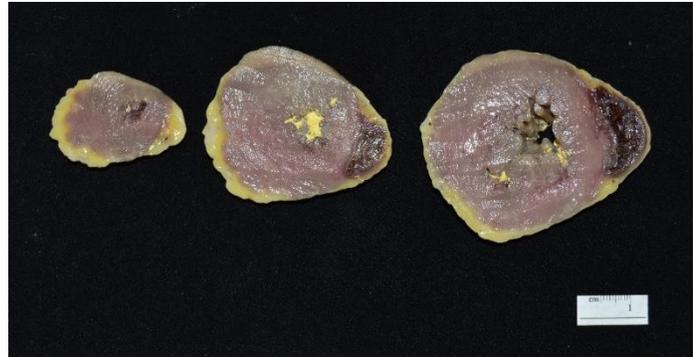
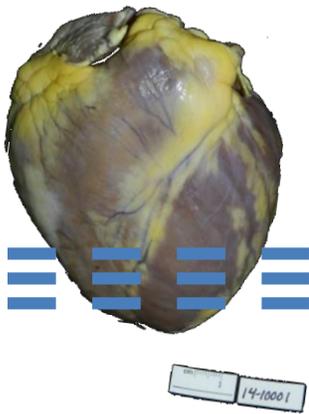
Follow all of the same steps as the basic protocol but also include:

- Cassette 10: AV node
- Cassette 11: SA node
- Cassette 12: Additional sections of descending coronary arteries

For Whole Submitted Hearts:

1. Make 1 cm slices up to 3 (or 4) cm from the apex. Photograph with ruler & section the final slice (3 or 4 cm) along the cut surface (the 3 or 4 cm cut surface – see above).

Make parallel slices perpendicular to the long axis. Final slice should be 3 cm from the apex in bonobos, chimpanzees and orangutans but 4 cm from the apex in gorillas (thus for a gorilla you would have 4 slices in the image).



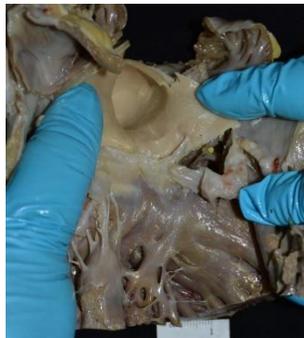
2. Open right side of heart along lines of flow. Measure R AV valve and pulmonic valve circumference. Photograph both valves. Section R atrium and ventricle.

Open the atrium from posterior vena cava to the auricle. Cut from the back (posterior side) of the right atrium into the right ventricle and out the pulmonary artery. Use string to measure the right atrioventricular (tricuspid) valve circumference and photograph. Take a long axis section of the right atrium and ventricle with valve and fix in formalin. Using string, measure the circumference of the pulmonic valve and photograph.



3. Open the left side of the heart. Measure the L AV valve circumference and photograph. Measure aortic valve circumference and photograph. Section L atrium, L AV valve and ventricular free wall as well as the interventricular septum with the aorta.

Open the left atrium from pulmonary vein to auricle and then make a single longitudinal cut perpendicular to this through the middle of the left ventricular free wall. Measure the left atrioventricular valve circumference using the string method. Photograph the inside of the left side of the heart with a ruler alongside the heart. Take a longitudinal section through the left atrium, atrioventricular valve and ventricle and fix in formalin. Cut through the left AV valve along the septum and into the aorta to open the aorta. Measure the aortic valve circumference using the string method. Take a longitudinal section of the septum from the aorta into the left ventricle and fix in formalin.



4. Take a cross section of the aorta at the arch (additional sections if there is evidence of an aneurysm or aortic dissection).

5. Section SA Node (if detailed protocol requested)

6. Section AV Node (if detailed protocol requested)

GAHP Cardiac Necropsy Check Sheet (fillable PDF) –
Pathologists: please submit with report, slide key and images

Whole Heart Submission

Photographs:

- | | |
|---|--|
| <input type="checkbox"/> <i>In situ</i> | <input type="checkbox"/> 4 Views: Anterior, Right, Posterior, Left |
| <input type="checkbox"/> Heart base | <input type="checkbox"/> 3 (or 4 for gorillas) slab sections from apex |
| <input type="checkbox"/> R AV valve | <input type="checkbox"/> Pulmonic valve |
| <input type="checkbox"/> L AV valve | <input type="checkbox"/> Aortic valve |

Measurements:

Heart weight _____ (g)	Heart circumference _____ (cm)
R AV valve _____ (cm)	Pulmonic valve _____ (cm)
L AV valve _____ (cm)	Aortic valve _____ (cm)

Slide Key:

Please attach key so we can determine which slide number corresponds to which specific myocardial section (either as text within necropsy report, attached table or by labeling a photo of slab in sections similar to pg 2 of this guide).