Green Solutions Group

Best for Every Body™

EMBALMING PROTOCOL

LONG-TERM ANATOMICAL FLUID

Summary

The embalming process for GreenMBalm® is not significantly different than the process with standard anatomical fluid, however, the process with standard anatomical fluid is not universal across institutions. Therefore, we recommend following the standards outlined in this document for the best preservation of GreenMBalm® bodies.

Best Practices for GreenMBalm®

1) Prior to embalming, the body must thaw to be at room temperature. This is achieved by removing the donor from the cooler and allowing it to slowly thaw and/or warm to room temperature for 8 – 12 hours. Once this is achieved, thoroughly wash the donor. This includes hands, feet, mouth, and genital area. Many issues can arise from external contamination present on the body before embalming. A complete wash can prevent issues during the holding period.
2) The body may be embalmed from the access point of choice. This is commonly either the carotid or the femoral arteries.
3) Drainage must be taken. The ideal avenue for drainage is the internal jugular vein on the right side. Make a small incision in carotid artery. The size of the canula to be used depends on the size of the vessel, ligature size, etc., and is at the embalmer's preference.

4) Before injecting the GreenMBalm® anatomical fluid, application of the GreenMBalm® pre-injection fluid will break up clots and condition the vessels for embalming. Application is 48 oz added to 3 gallons of deionized water (1.42Liters/11.36Liters). You can also add a small amount (3 ounces/88.72ml) of red dye into the pre-injection mixture if desired. Inject half of the 3-gallons (1.5 gallons/5.68L into a closed drainage system, use low flow, and above moderate pressure. Massage limbs ensuring fluid gets to fingers and toes, look for vascular distention. Allow 45 minutes for fluid to remain in the body. After 45 minutes, open drainage and inject the remaining 1.5 gallons/5.68L into the body. You will notice during drainage the removal of coagulated blood from the body. As the draining blood becomes clearer, you will then close the system as you are ready to begin using the ready-to-use anatomical embalming fluid for long-term preservation.
5) Preservation of the brain. Remove 16 ounces (473.18 ml) of GreenMBalm embalming fluid from the container. Using an 18-20-gauge needle inject 8 ounces (236.59 ml) of GreenMBalm ready-to-use anatomical embalming fluid into the inner canthus of each eye. Use the entire 16 ounces (473.18) of fluid.
6) For injection, use 2.5 gallons (9.46353 Liters) of the GreenMBalm® ready-to-use anatomical embalming fluid for every 50 lb. (22.6796 Kg) of body weight.

7) Anatomical embalmers, when using traditional formaldehyde/phenol solutions, will use a high pressure and rate of flow to force the fluid through the system. **DO NOT DO THIS** when using GreenMBalm®. When using the ready-to-use solution, begin with a low pressure, rate of flow, and increase according to case analysis and effect of the body. Giving a starting point for pressure and rate of flow is not possible due to the variations with different machine calibrations, but if you are watching the flow from the canula, when the stream goes from a drizzle to a solid stream it is right around where you want to be.

Signs of Preservation

With standard formaldehyde anatomical fluid, you see the typical signs of preservation, such as the firming and bleaching of tissues. With GreenMBalm®, the signs will be different from the typical anatomical embalming process.

1) Rather than looking for the firmness of tissues, you will look for the fullness of tissues. A good comparison would be an orange and a stress ball. With standard anatomical fluid, the skin will feel like an orange, which is firm and rough. With GreenMBalm®, the tissue will feel "full," but not exactly firm, like what a stress ball filled with sand would feel like.
2) As the fluid diffuses into the tissues, you may see a few white spots start to surface on the skin. This is normal, and the white spots will fade as the donor cures for use, and diffusion is complete.

3) Curation time for a standard embalming donor can typically be around 1-3 months, but GreenMBalm® can cure from 2 weeks to 6 months depending on the needs of the program. It is recommended the donor cure for 1-month prior to use in the anatomy lab. The longer the donor cures, the more solid the tissue will feel. There is no problem from a preservation standpoint in using a shorter curation time.
4) When you begin dissection of the donor, the tissues will be moister than a formaldehyde donor. This is typical, and not a cause for concern. The tissues (especially vasculature) will be softer and more pliable, with more natural coloration. This is the desired effect to get life-like tissue and not an indication of poor preservation. It is the difference between GreenMBalm® and standard anatomical fluids.
1) Avoid substantial amounts of airflow over the body. This can be necessary with formaldehyde donors but can dry GreenMBalm® donors. The airflow is used to control off-gassing, which is not an issue with GreenMBalm® donors.
2) We recommend checking the donors daily. However, at a minimum, inspect your donors every two days.

Maintaining the Donors

There is a significant difference between maintaining a formaldehyde donor and maintaining a GreenMBalm® donor.

Some of the typical maintenance methods used for formaldehyde donors can damage GreenMBalm® donors, so it is important to follow this protocol.

1) Refrigeration of the donors is not needed, unless your lab environment is excessively warm, more than 72 degrees or has a large amount of natural light exposure. Natural light exposure is not recommended. If you do use refrigeration, do not consistently move the donors in and out of the cooler. The temperature changes, refrigeration vent contamination, and moisture changes can cause drying concerns.
2) To protect the hands and feet from drying out, the best practice is to liberally apply Vaseline on the fingertips and toes. Once applied, cover the hands and feet with a paper towel and cover the paper towel with a zip-lock bag. Do not attempt to zip the bag. Leave the paper towel and zip-lock bag on the areas until you are ready for dissection. Once ready for dissection, remove the zip-lock bag and paper towel and wipe the Vaseline from the fingertips or toes.
3) Do not shroud GreenMBalm® donors with towels. Using towels can dehydrate the donors. Store donors in a body bag only and at room temperature. Always ensure the body bag is zipped up and closed when the donor is not being used.
4) If you face dehydration for any reason, soaking sterile cheesecloth with GreenMBalm® and wrapping the

affected area can reconstitute the tissues if it is addressed before the tissues become hard.

5) Do not fully drain excess fluid from the body bag. Leaving a small amount is good for the donor and does not cause an issue with off-gassing like formaldehyde does.
6) Alcohol will evaporate and there are circumstances that can cause the green bodies to become dry. If there is a high number of air exchanges in the lab, this can affect the donor drying out. If tissue is drying out, we recommend using our nontoxic wetting solution. Spray the donors weekly to ensure the tissues remain moist.
7) Ensure that users change gloves between donors just as they would with a patient, to control cross contamination. Always practice universal precautions.
8) Avoid substantial amounts of airflow over the body. This can be necessary with formaldehyde donors but can dry GreenMBalm® donors. The airflow is used to control off-gassing, which is not an issue with GreenMBalm® donors.
9) We recommend checking the donors daily. However, at a minimum, inspect your donors every two days.