OrganKits
for STEAM

MENTALHEALTH AND MINDFULNESS
OBTAINING PLASTINATED BOVINE BRAINS

Co-funded by
the European Union

REVISION HISTORY

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1. SUBJECTS

Indications of the modus operandi to perform the extraction of cattle brains and later their fixation to be able to perform different plastination techniques or simply leave the brain fixed.

2. REAGENTS, PRODUCTS & MATERIALS

PRODUCTS

- Formaldehyde

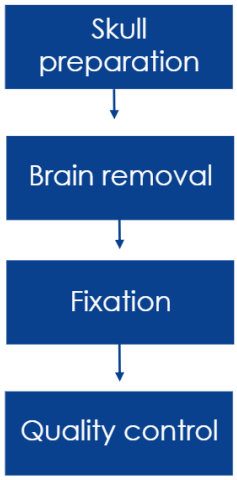
MATERIALS

- Hammer
- Chisel
- Scalpel with curved blade
- Forceps
- Band saw

PERSONAL PROTECTIVE EQUIPMENT

- Self-contained motorized respiratory protection system.
- Gloves
- Scrub
- Safety shoes

3. OPERATING PROCEDURE



3.1 PREPARATION OF THE SKULL

Starting from an already fleshed skull, the jaw must be disarticulated with the help of a band saw, to help manipulating the skull.

First, a cross-section is made at the level of the eye socket and then a sagittal incision with respect to the brain is not very deep to avoid damaging it.

With the help of a chisel and a hammer, tap on the area of the sagittal incision until the skull is completely opened.

3.2 BRAIN REMOVAL

First, the *brain dura mater* must be sectioned in order to separate one of the skull's halves and get a better access to the brain itself. The dura mater is then cut to access the *subarachnoid space* at different levels.

The cranial nerves at the base of the skull, the epiphyseal recess, and finally, the *tentorium of the cerebellum* and the *sellar diaphragm* will be sectioned. Special care must be taken in the sellar diaphragm section so as to preserve the *pituitary gland*. Likewise, in the final movement of separation of the brain, tearing of the *olfactory bulbs and peduncles must be avoided.*

Once extracted, the brain must be immersed in room temperature running water. Finally, a gentle massage is provided so any remaining blood is extracted from the blood vessels at the base of the skull and pia mater.

Prior to fixation, the meninges may or may not be removed.

3.3 FIXATION

The fixation of the brain will be carried out at approximately 4ºC and will last about 2 months.

It is performed by immersion, leaving the brain completely immersed in 2.5% formaldehyde in a first bath, and gradually increasing the concentration of the fixative weekly. That is: once a week the concentration of fixative is increased by 2.5% until a concentration of 10% is obtained.

Ventricle injection

In the second week of fixation, the injection of cerebral ventricles will be performed. With a syringe, the lateral ventricles (through the *piriform lobes*), and the 3rd and 4th ventricles will be accessed, and 5% formaldehyde will be injected until a slight increase in the volume of the ventricles is observed.

Brain placement

To prevent the brains from straining during fixation when in contact with the base of the vessel, they'll be suspended in the fixation solution.

For that purpose, three suture threads are needed:

1. Thread attached to the *Circle of Willis* around the pituitary gland.
2. Thread attached to the pituitary gland itself.
3. Thread attached from one end to another on the surface of the vessels.

4. RESULTS AND QUALITY CONTROL

Following this protocol, a complete brain, with all its fundamental structures, vascularization of the skull base and cranial nerves, is obtained.

The presence of the pituitary gland and olfactory bulbs are signs of quality.

For the preparation of the case, hearts with 2 possible presentations must be provided:

1. WHOLE BRAIN

2. MIDDLE SAGITTAL SECTION

Checklist (applicable to possible submissions)

- Suitable color ( )
- Adequate size, no alterations due to retraction ( )
- Firm and non-greasy texture ( )
- Absence of odours ( )
- List of structures
    - Entire cerebral hemispheres ( )
    - Telencephalon grooves ( )
    - Rhinencephalon (piriform lobe) ( )
    - Diencephalon (hypothalamus) ( )
    - Diencephalon (epiphysis) ( )
    - Diencephalon (pituitary) ( )
    - Optical Chiasm ( )
    - Lateral ventricles ( )
    - Midbrain (cerebral peduncles) ( )
    - Midbrain (colliculi) ( )
    - Midbrain aqueduct ( )
    - Bridge ( )
    - Cerebellum (tree of life) ( )
    - Medulla oblongata (pyramids) ( )
    - Oculomotor nerve ( )
    - Trigeminal nerve ( )
    - Other additional cranial nerves ( )

END OF DOCUMENT

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UNIVERSIDAD DE MURCIA

mdc
I.E.S. MIGUEL DE CERVANTES

ISTITUTO SUPERIORE DA|LG

PLATON SCHOOLS

Bahçeşehir Koleji

DISCOVER-IN
anatomy at your hands

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