

Modelling Breast Cancer: Intraductal Injections

Introduction

Breast cancer is the most commonly diagnosed cancer in women worldwide, but it also occurs in men. A wide range of animal models have been developed to model specific types of breast cancer, both in mice and rats. Tumour cell lines or tissue can be transplanted subcutaneously, directly into the mammary fat pad or can be injected directly into the mammary gland ducts.

Intraductal injection of tumour cells is superior to mammary fat pad transplantation when modeling breast cancer progression, since this technique grafts cells into a location with a microenvironment that is more similar to the human ductal breast carcinoma.

1

Materials

- EVO Cam II, Vision Engineering
- Monitor of choice
- Hotplate A4
- Hamilton glass syringe 50 µl (see A)
- Small RN Needle 34 gauge needle 0.16 x 0.05 mm
- Dumont Super Fine forceps No. 5 (see B)
- Injection substance (e.g. virus/cells)
- Evans Blue dye solution 2 mg/ml Sigma
- Isoflurane evaporator

2



A



B

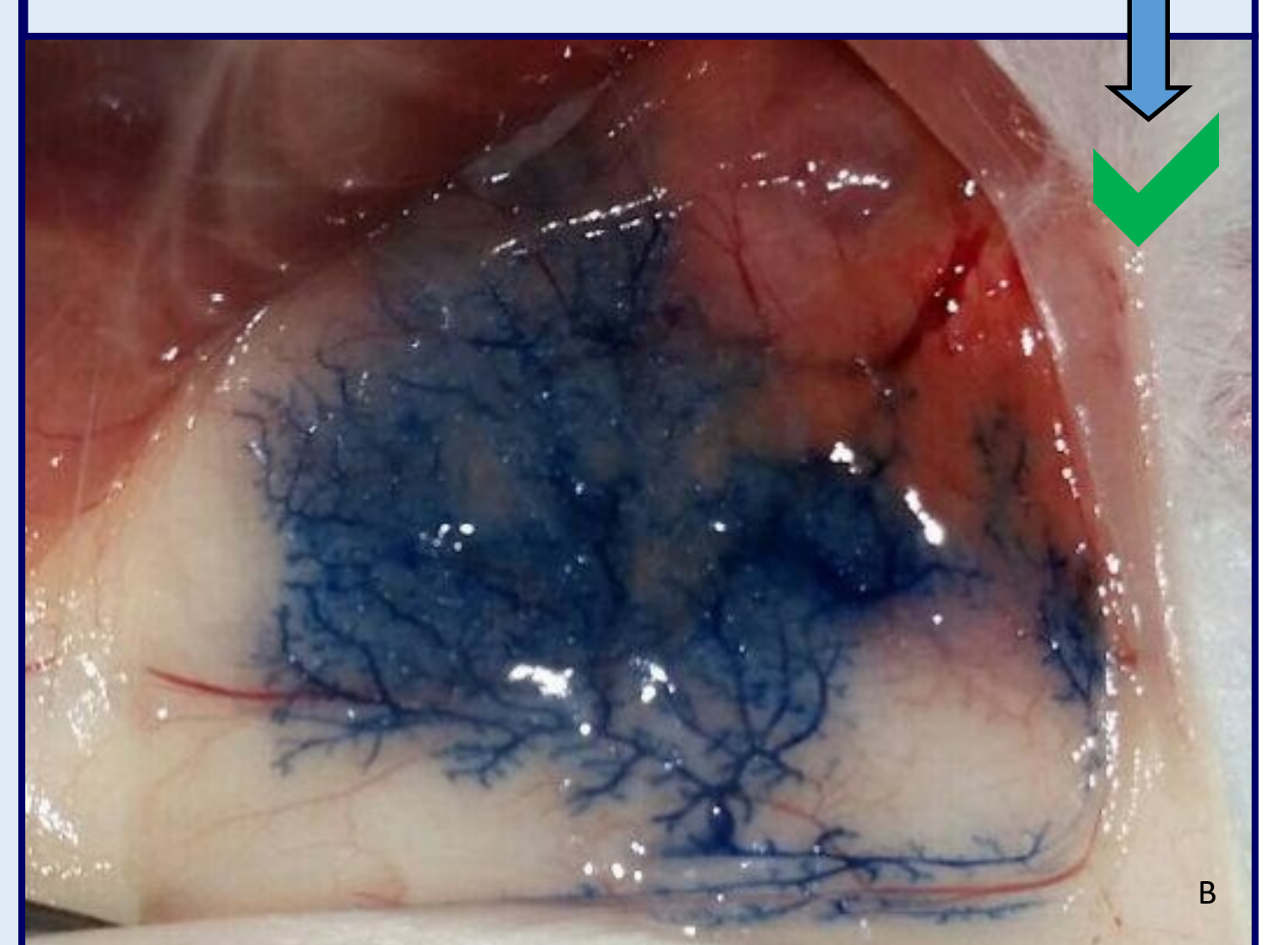
Good to know:

- Non-invasive procedure
- No need for analgesia (It is not necessary to cut the nipple)
- Reduction of animal numbers since 4 glands can be injected
- Injection substance can be injected directly in to the mammary duct therefore mimicking human disease
- Modelling of in situ disease stages possible
- Timed tumour induction possible
- Mice have fully developed mammary glands at the age of 8 weeks
- Injecting glands preferable 3th and 4th mammary gland
- You can check whether the injection was successful if the solution disperses in the ductal tree (See A and B)
- Hair removal using blades instead of Veet: increase animal welfare
- Takes time to properly learn the technique

3



Injected in mammary gland



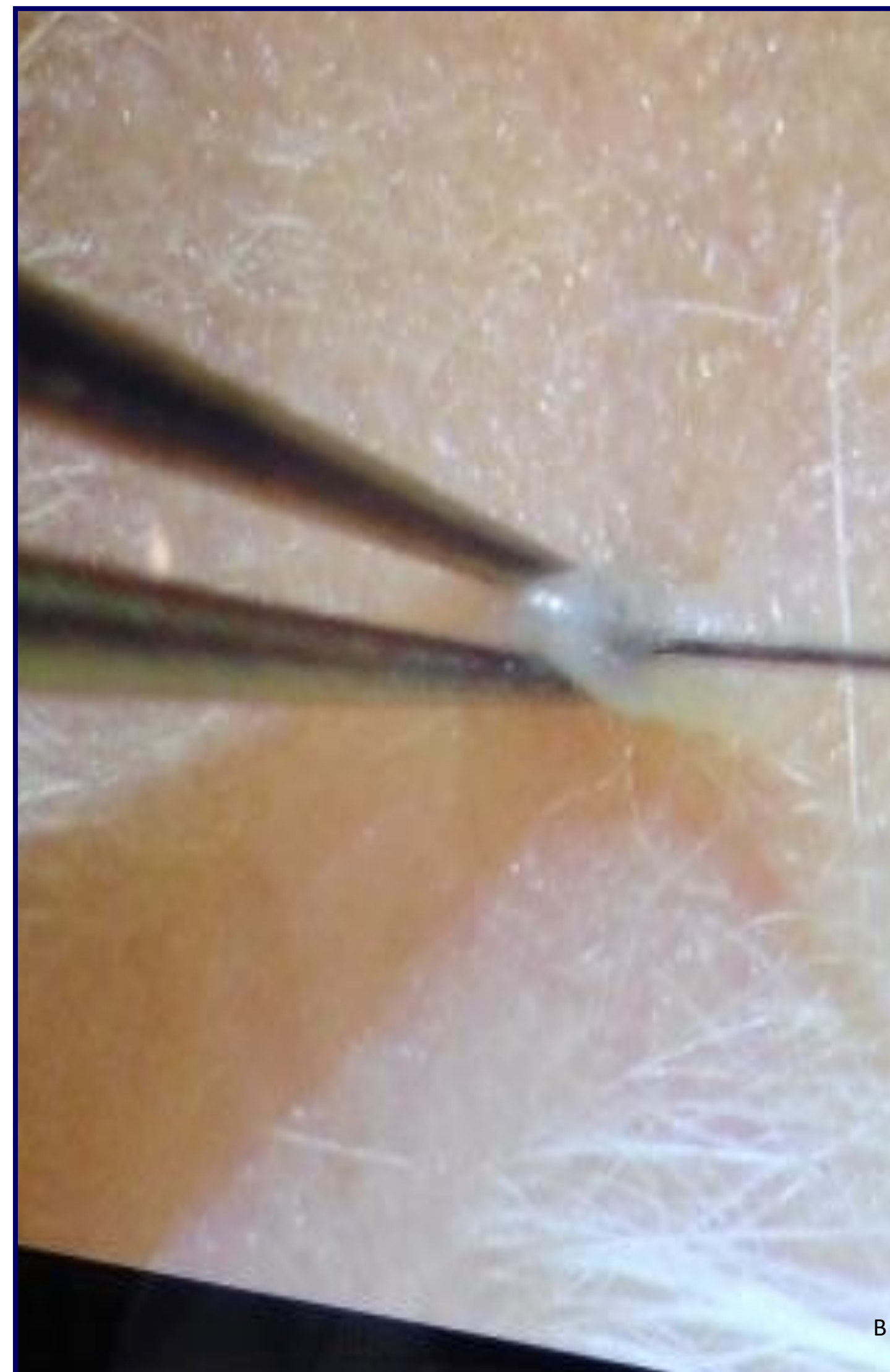
Injected in Ductal Tree

Methods

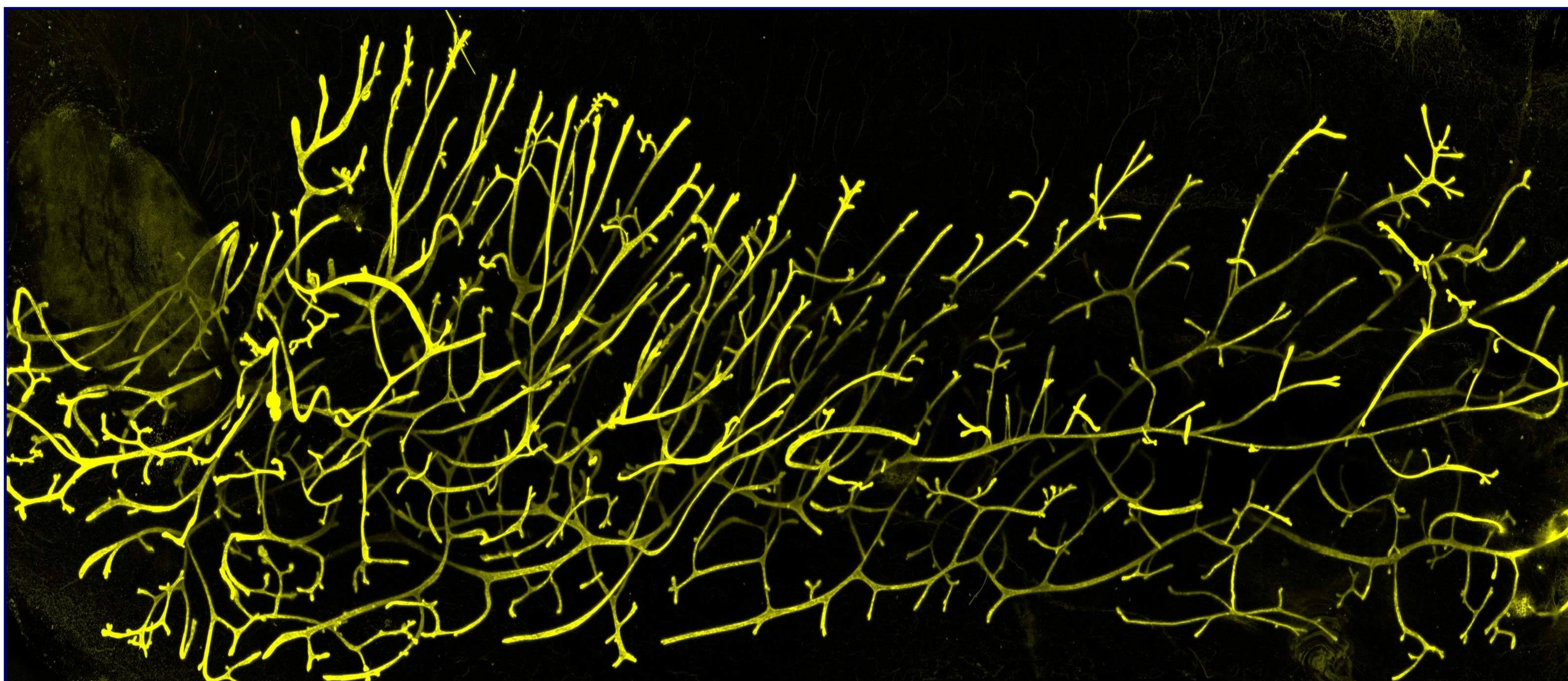
1. Set up biosafety hood with the necessary equipment and materials
2. Anesthetize the animal with isoflurane ~2% flow at 0.4L/m air and 0.2L/m oxygen for the correct ratio of oxygen and air (and keep anesthetized during entire procedure)
3. Add eye drops to keep eyes lubricated
4. Shave the injection area with blades according to basic principles of good practice
5. Prepare the syringe with the substance of interest
6. Use forceps to remove the cap of dead skin from the nipple (See A and B)
7. Fixate the nipple between forceps
8. Inject the substance into the duct of the mammary gland
9. Slowly remove needle
10. Place animal back in the cage
11. Monitor the animal until it fully recovers from the anaesthesia



A



B



4

References

MCCA



References

