STORYBOARD

Stereotaxic manipulation

Neurosciences - Anxiety mechanisms

In this document, only a few interface design examples
are presented. This project is still in production phase, all assets
are not available or finalized. Mice simulation and AI must be
inserted.

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Scene - 01   In the office

Description :

At launch, the user is in the desktop.
He will use the computer to watch a video on animal surgery before establishing its protocol.

Goals :

- Checking ethical approval
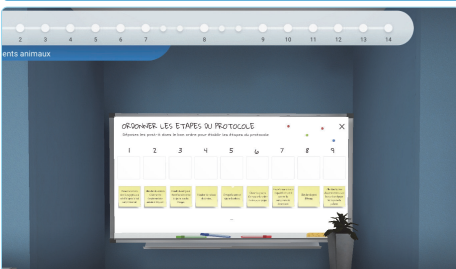- Definition of the experimental

Interactions :

- Use of the computer to view videos of surgery on the animal
- Give choice for qualification between animal manipulation or surgery

Possible mistakes :

- Wrong ethical approval

Scene - 02   In the office

Description :

Still in the office, on the board, the user will define the protocol to follow.

Goals :

- Preparing the list of experimental tasks
- Defining the correct order of tasks

Interactions :

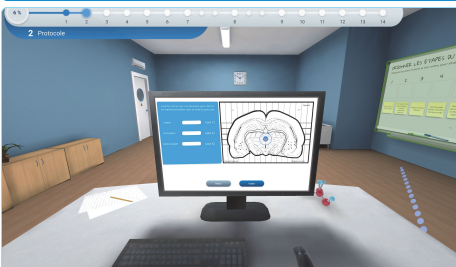- Sorting, placing the tasks (post-it)

Possible mistakes :

- Wrong post-it order

Consequences : scene 02 and scene 04   ✔ Access to the locker room   ✖ Stuck in the office

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Scene - 03   In the office

Description :

An Atlas is available to define the experimental conditions.

Objectif :

- Define the coordinates of the injections using the Stereotactic Atlas of the Mice Brain. **(lateral, depth, antegrade-posterior)**
- Calculation of the sample size taking into account possible sex differences.

Interactions :

- Search, find contact details

Erreurs possibles :

- Wrong coordinates

Consequences : scenes 10 to 11   ✔ Successful Injection   ✖ Wrong injection / Biased results

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Scène - 04   In the locker room

Goals :

- Hands washing
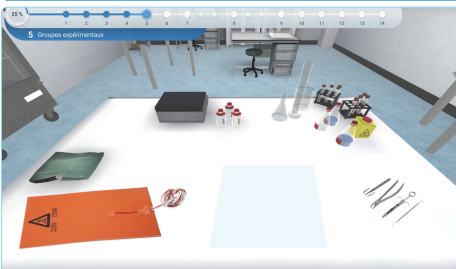- Dress with appropriate single-use equipment

Interactions :

- Wash your hands in the sink
- Choose the right outfit to gain access to the laboratory

Possible mistakes :

- Choosing the wrong outfit

Description :

The student goes into the locker room to start prepare.

Conséquences : scene 05 to scene 14   ✔ Access to animals housing room   ✖ Stuck in the locker room

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Scène - 05   In the laboratory

Goals :

- Define the operating field: choice of analgesics, antiseptics, antibiotics, surgical tools, heating pad, cleaning materials.
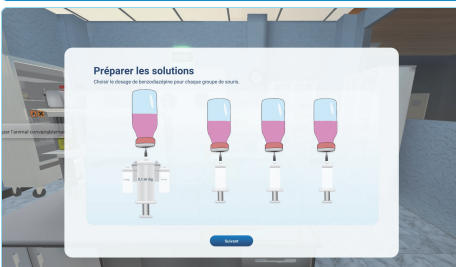- Prepare the workstation: decontamination with UV lamp, hygiene and amp, safety procedures.

Interactions :

- Choice of drugs
- Choice of tools

Possible mistakes :

- None

Description :

Once out of the locker room, the student returns to the laboratory to prepare his injection station.

Scène - 06   In the laboratory

Goals :

- Preparation of the solution to be injected (drug or neuroanatomical tracer) to be defined for the room
- Cleaning the stereotaxic frame
- Choosing the syringe and injection needles
- Attach Syringe to Frame/Stereotaxic Pump   `View video`

Interactions :

- Clean the stereotaxic frame
- Calculate the dilution of the solution to be injected
- Attach the syringe

Possible mistakes :

- Forgetting to clean the stereotactic frame
- Miscalculation of dilution

Description :

The injection station is ready, the student prepares then the stereotactic station.

`View video`   The video is available in the office computer

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Scene - 07   In the animals housing room
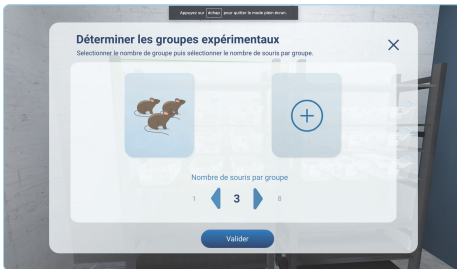
Description :

Once the stereotactic frame is prepared,
the student, goes to the pet shop to choose the
groups of mice to continue the experiment.

Goals :

- Choose the exact number of groups
- Choose the exact number of mice per group
- Take the transport cage to the experiment laboratory

Interactions :

- Choose the number of groups
- Choose the number of mice per group

Possible mistakes :

- Bad choice number of groups
- Bad choice of the number of mice per group

Scène - 08   In the laboratory

Description :

To put the mouse to sleep, the student has,
at his disposal, several products that will lead
him to a choice anesthetic.

Goals :

- Choose the appropriate anesthetic

Interactions :

- Read labels

Possible mistake :

- Wrong choice of anesthetics

Consequences : scenes 09 to 13   ✔ Sleeping mice   ✘ Restless mice

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Scène - 09   In the laboratory

Description :

After choosing the set of mice for its
experimentation, the student places his first
subject on the workstation.

[View video] The video is available in the office computer

Goals :

- Preparing the stereotactic apparatus by attaching the syringe
- Place the heating pad
- Anesthetize the mouse (gas anesthesia)
- Place the animal's head between the ear bars   [View vidéo]

Interactions :

- Placing the anesthetic mask on the mouse's muzzle
- Handling of the ear bars (placement and/or verification of the stability of the head)
- Application of a local anesthetic and antiseptic

Possible mistakes :

- Forget a step
- Wrong product selection

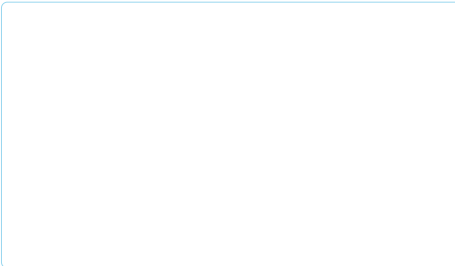**Consequences : scenes 09 to 13**   ✔ Sleeping Mice / Steady Skull   ✘ Awakened Mice / Unstable Skull

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Scene - 10   In the laboratory

Description :

Everything is ready. The workstation is in place, the animal is stable and ready for surgery.
The surgery begins.

Goals :

- Shave the animal's skull
- Incise the skin
- Clean the blood
- Find **lambda** and **bregma** and set zero
- Move stereotaxy to correct **XY coordinates**
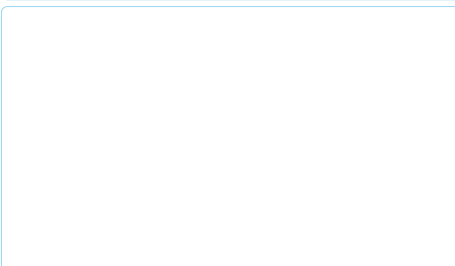- Mark the location to be drilled on the skull

Interactions :

- Handle a tool to **shave**
- Handle a tool to **incise**
- Handle a tool to **clean**
- Move the stereotaxic device

Possible mistakes :

- Forget a step
- Wrong coordinates

Scene - 11   In the laboratory

Description :

For the first step, the student will have to inject the previously prepared solution into the animal's brain.

Goals :

- Drill the skull
- Lower the needle to the right depth in the brain
- Injection / Placement of a cannula

Interactions :

- Milling machine handling
- Use of the stereotaxic device (needle descent, waiting for diffusion, withdrawal of the needle)
- Using the injection pump

Possible mistakes :

- Not waiting long enough for the product to spread
- Bad injection rate

> Consequences : scenes 12 and 13   ✔ Successful Injection   ✘ Brain injury / Bleeding

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Scene - 12   In the laboratory

Description :

The animal received its injection. The student will clean his injection station and provide the necessary care for the post-operative follow-up. animal operation.

Objectifs :

- Sew the incision **(if there is no cannula)**
- Fix cannula with cement **(if there is a cannula installation)**
- Remove the mice to place them in a rescue cage
- Adjusting the rat wake-up temperature

Interactions :

- Injection site cleaning
- Sew the animal
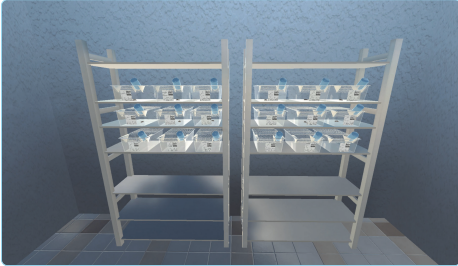- Handle the animal
- Temperature setting

Erreurs possibles :

- Forget a step
- Wrong temperature selection

Scène - 13   In the laboratory and animals housing room

Goals :

- Wait for the mouse to wake up (laboratory)
- Clean tools and surgery station
- Put the rat(s) in a transport cage
- Return the animals to their individual cage in the animal facility

Interactions :

- Handle the cage
- Cleaning tools and surgery station

Possible mistakes :

- Improper cleaning of tools

Description :

After about 1 hour, the student is back in the pet store with the mice to put them back in their individual cage.

Scène - 14   In the locker room

Goals :

- Remove personal equipment and dispose of it
- Hands washing

Interactions :

- Discard equipment
- Hands washing

Possible mistakes :

- None

Description :

After depositing the mice in the animal facility, the student will throw away their single-use equipment and wash your hands.

The first part of the experiment is over. The student will have to wait a few days before returning to observe the behavior of the mice.

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In the second part of the experiment, the student will return to the laboratory. He will recover the operated mice to perform the behavioral experiment with the aim of evaluating the effects of the surgery performed in the first part of the experiment.

If a cannula has been placed, the behavioural experiment will be preceded by the injection of the solution (to be chosen and prepared) in transiently anesthetized mice.

The behavioral device to use is the Openfield and the +Maze. The other device will be simulated in a subsequent phase of practical development.

Scène - 15	In the animals housing room and the laboratory
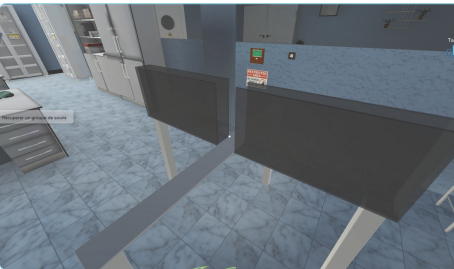
Description :

A few days after the injections on the mice, the student returns to observe the results of the previously performed operation.

Goals :

- Find the individual cages of the mice that have been operated on
- Take the mice to the lab
- Place a rat in the experimental device
- Observe animal behavior
- List their attitudes/reactions
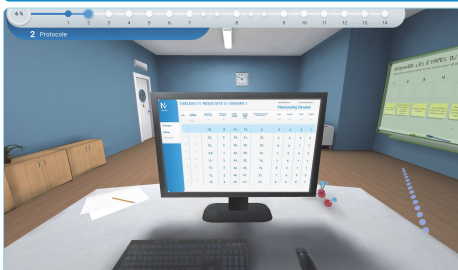
Interactions :

- Carry the cage(s)
- Handle the animal
- Identify their behaviors

Possible mistakes :

- Misidentification of behaviors

ℹ The behavioral observation room is separate from the room where the surgery is performed ℹ

Scène - 16	In the locker room and the office

Description :

The student comes to check the results of his experimenting on the computer in the office.

Goals :

- Check if the results obtained are correct

Interactions :

- Wash your hands
- Consult the computer

Possible mistakes :

- None