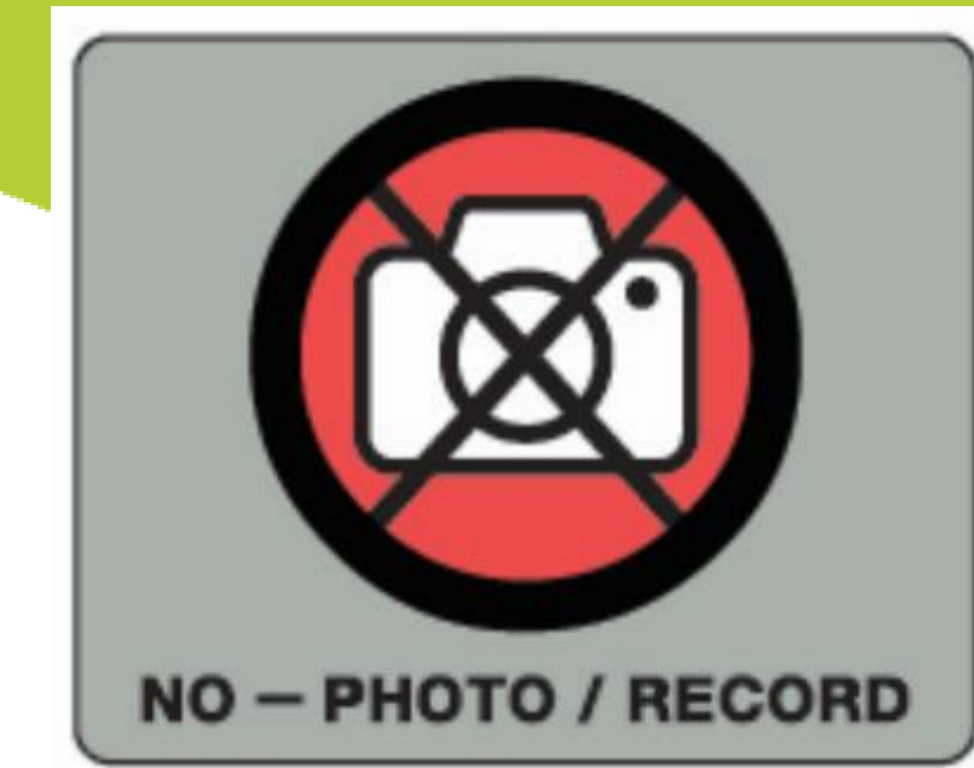


# A Novel Surgical Adhesion Model for Studying Endometriosis-Induced Pain and Evaluation of Celecoxib Treatment

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## Abstract

Endometriosis, a condition characterized by the growth of uterine-like tissue outside the uterus, is known to cause chronic pain. It affects a significant percentage of women, with estimates ranging from 3-15% of women in their childbearing age and 25-35% of infertile women. Annually, approximately four out of 1,000 women between the ages of 15 and 64 require hospitalization due to endometriosis.

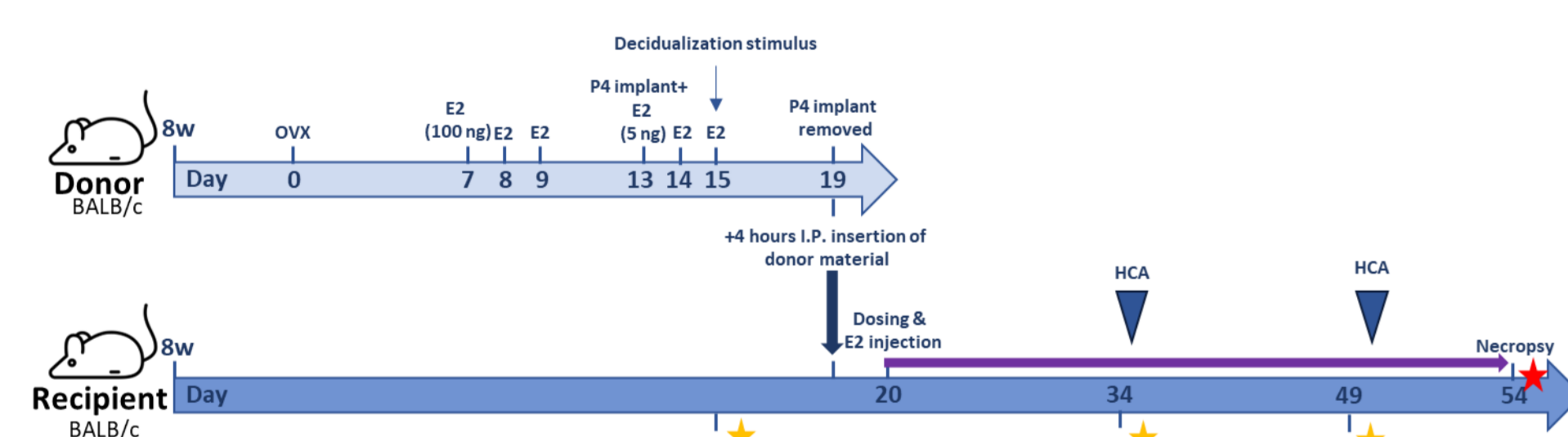
While there are existing animal models for studying endometriosis, they often face limitations in accurately measuring the number of cysts. To address this challenge, our study utilized a direct surgical adhesion model. By employing this approach, we were able to observe consistently formed cysts and increased pain response in the groups with surgically implant endometriosis compared to the control groups. Furthermore, treatment with Celecoxib, a pain-relieving medication, led to an improvement in pain response assessed using the von Frey test while no significant changes in pain response were observed using the abdominal PAM test, confirming the efficacy of adhesive endometriosis in our model.

To validate our novel endometriosis model, we utilized the Home Cage Analysis (HCA) system, which enables the analysis of animal behavior phenotypes. Principal Component Analysis (PCA) of the HCA system data revealed distinct differences between the control and endometriosis groups. However, no significant modifications were observed in the Celecoxib treatment group compared to the endometriosis group.

In summary, our study successfully induced endometriosis and increased pain response in donor mice through the implantation of donor tissue to recipient mouse by surgical glue and modified phenotype through HCA. This newly developed model may serve as a valuable tool for further investigating the mechanisms underlying endometriosis-induced pain and exploring potential treatments for this condition.

## METHODS

### Study design



### Materials

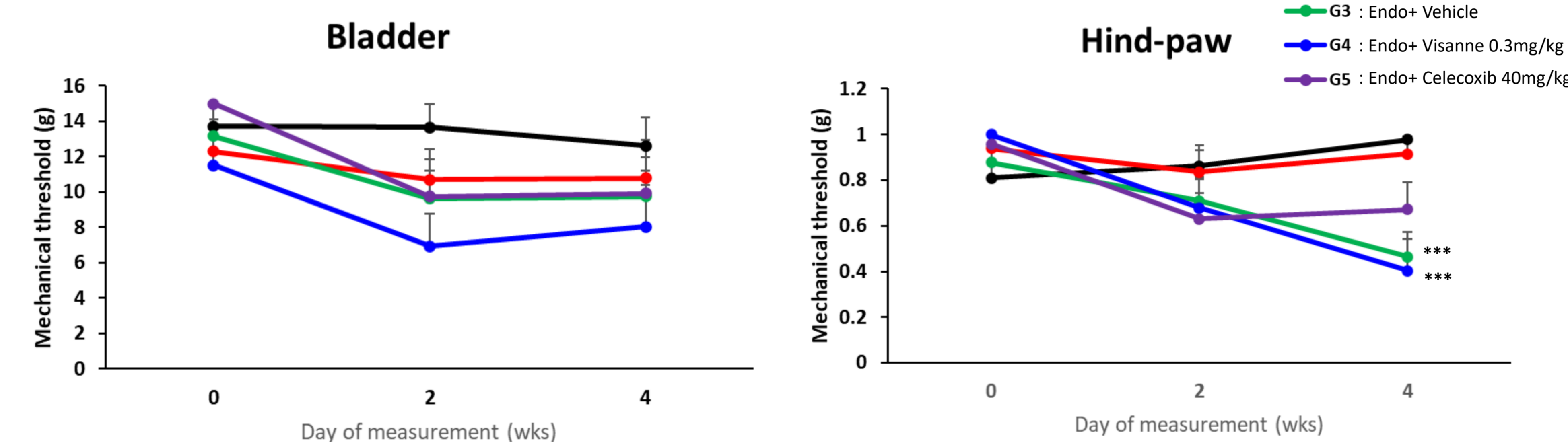
- Animal: BLALB/c
- Age: 8 weeks
- Group informations
  - ✓ G1: Control (n=10)
  - ✓ G2: Sham (n=10)
  - ✓ G3: Glue endometriosis + vehicle (n=10)
  - ✓ G4: Glue endometriosis + Visanne 0.3 mg/kg (n=10)
  - ✓ G5: Glue endometriosis + Celecoxib 40 mg/kg (n=10)

### Implanted tissue

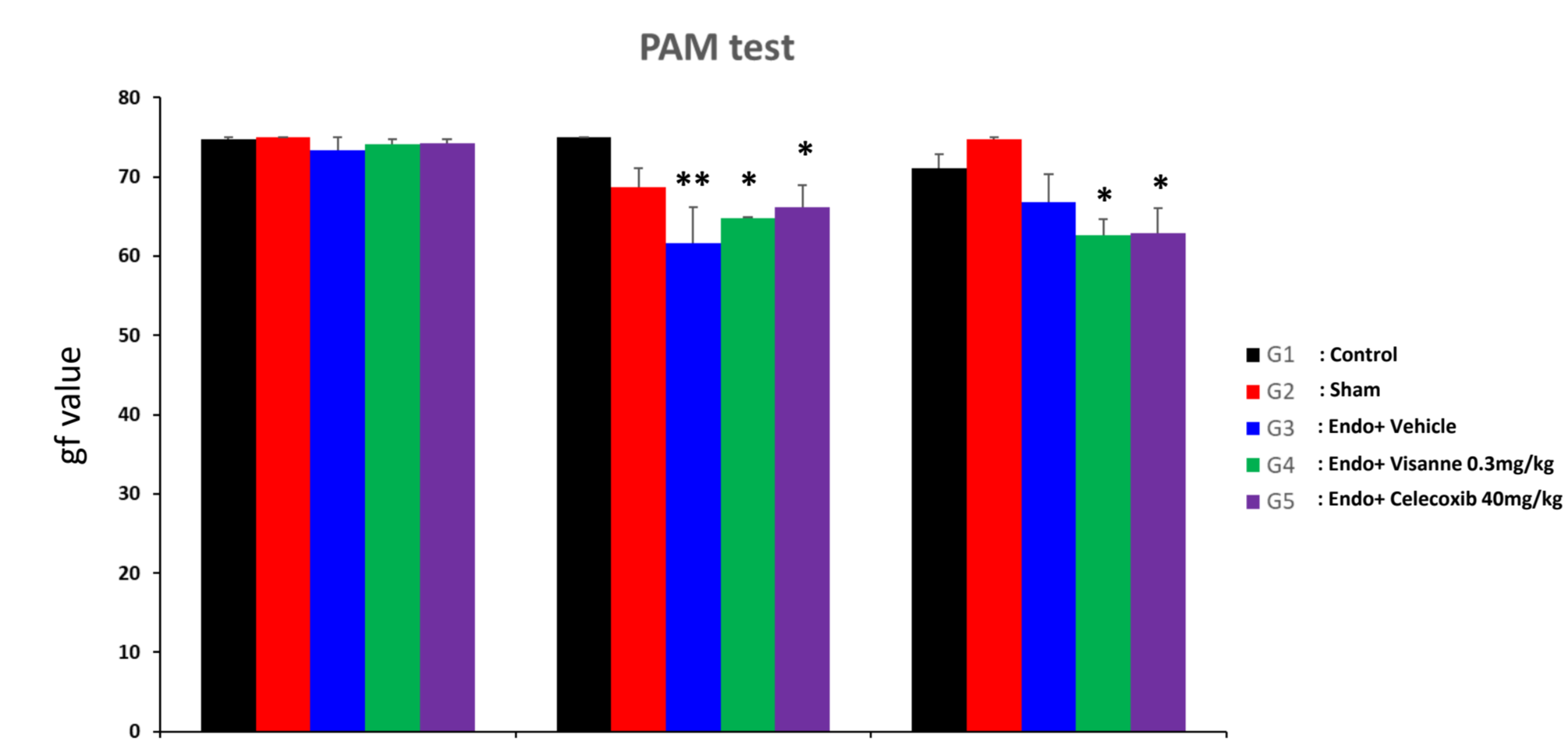


## RESULTS

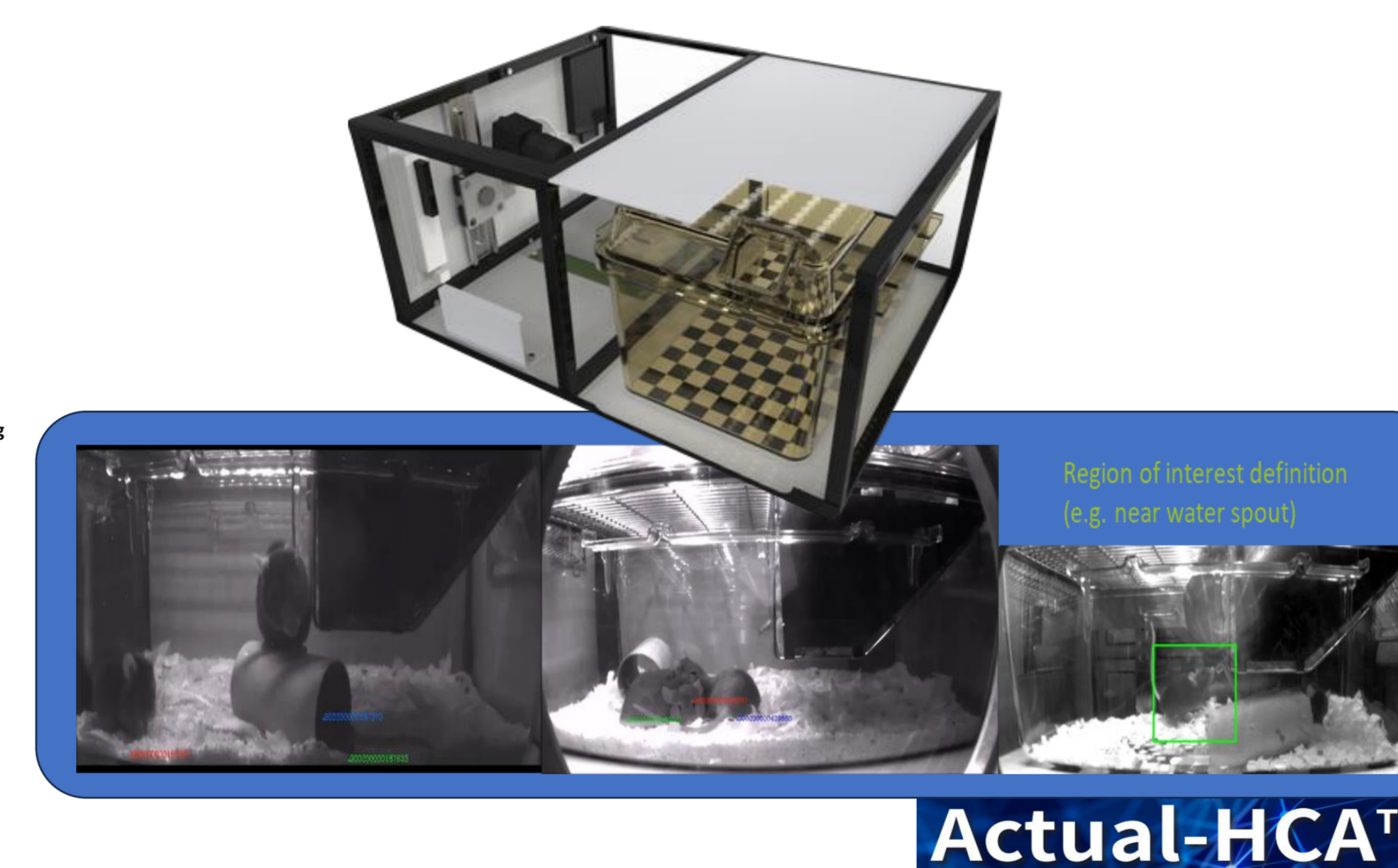
### VonFrey test



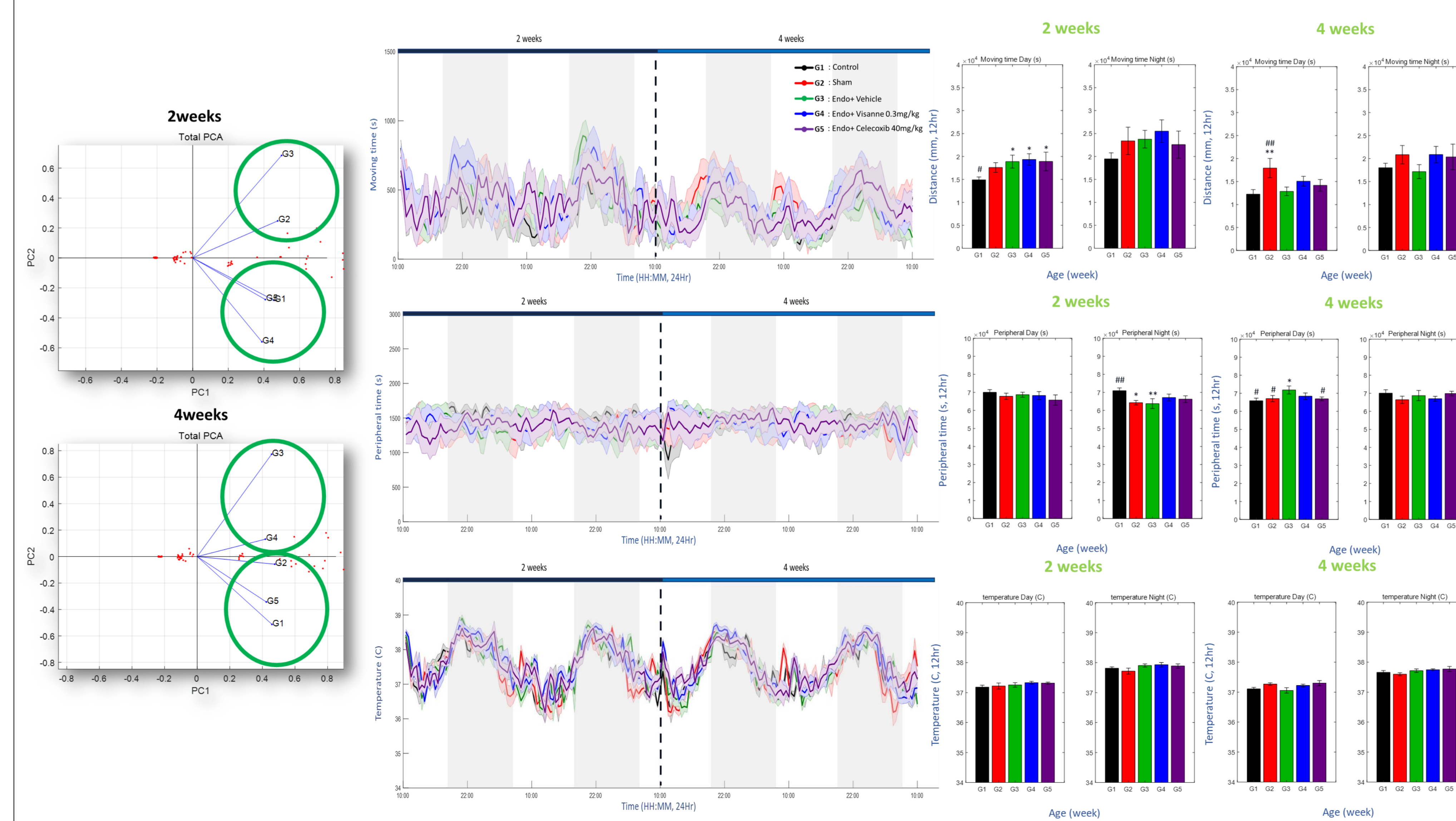
### PAM test



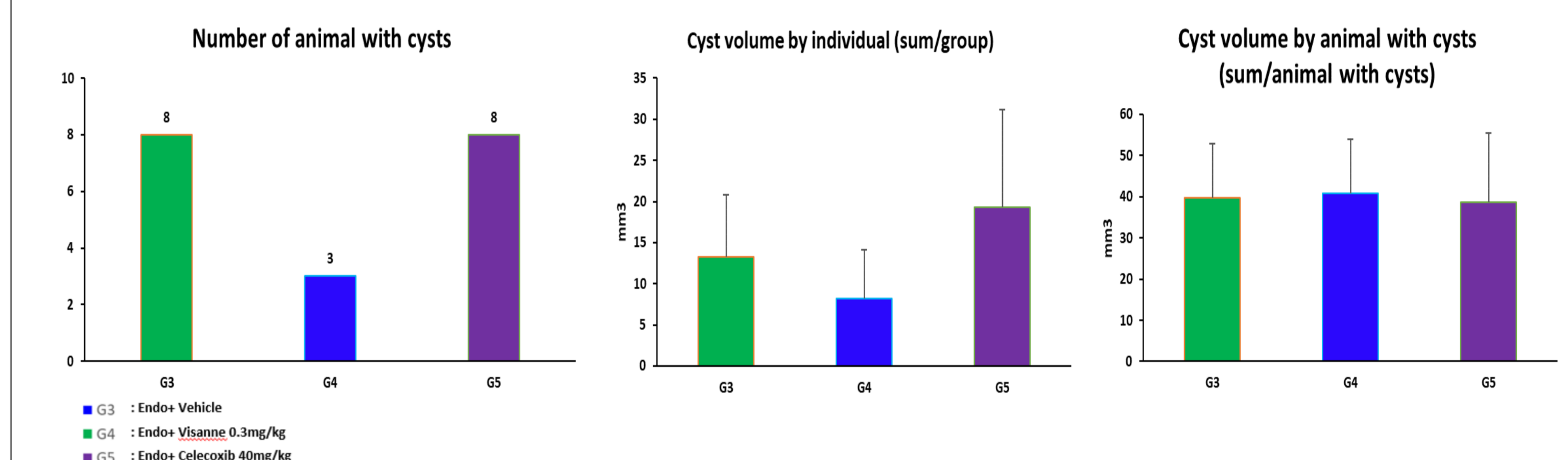
### Home cage analysis Equipment



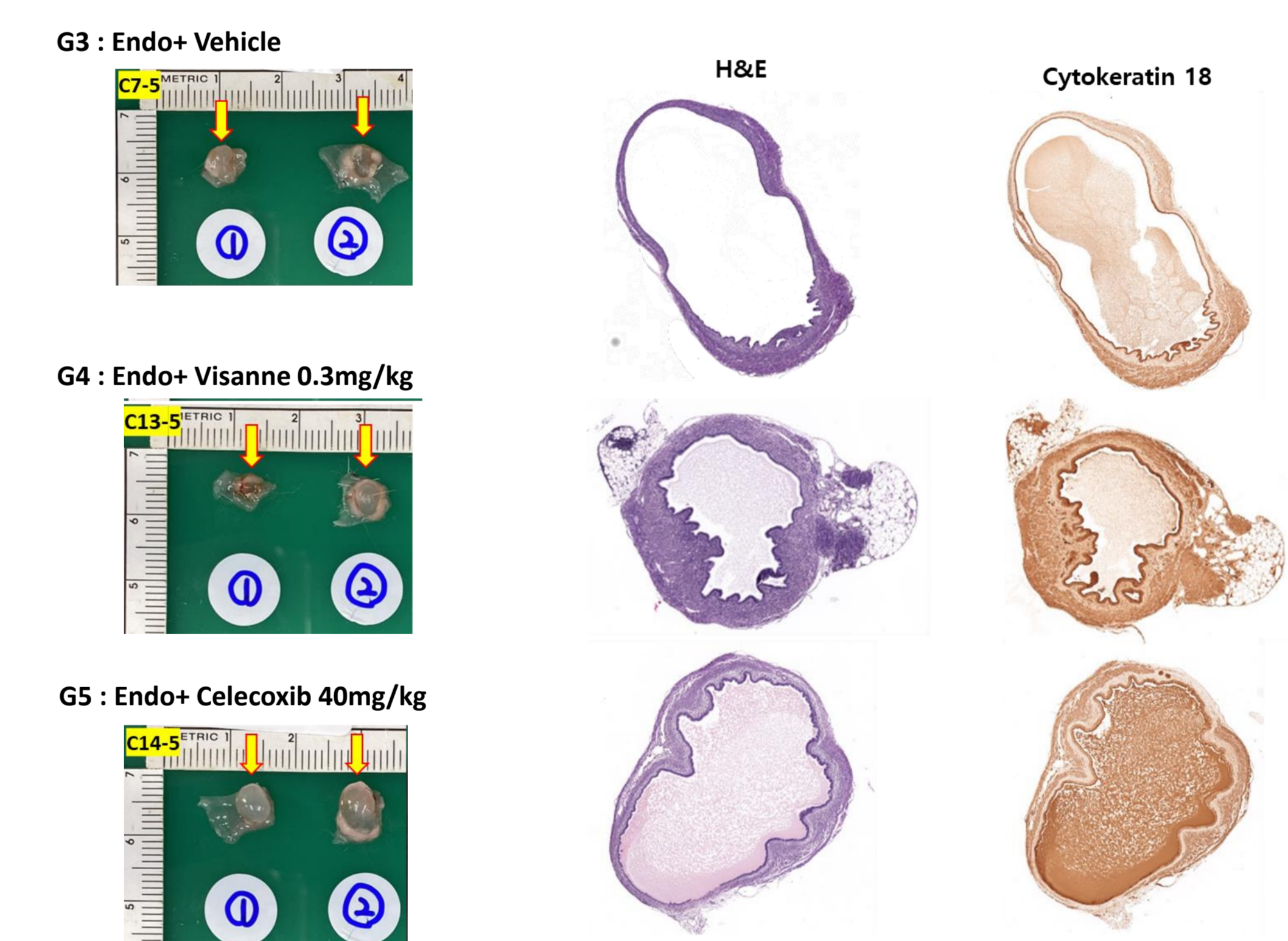
### Home cage analysis test



### Cyst Numbers & volumes



### Cyst Histology



## Summary

1. **VonFrey Test at Hind-paw Location** : Significant differences in hind-paw positions were evident between the Control and Endometriosis groups after 4 weeks as per the VonFrey test results.
2. **VonFrey Test at Bladder Location**: No significant differences were observed among groups in VonFrey test outcomes at the bladder location.
3. **PAM Test**: A significant disparity in PAM test results was noted between the Control and Endometriosis groups at week 2. However, no such distinction was observed at week 4.
4. **HCA**: Principal Component Analysis (PCA) of the HCA system data revealed distinct differences between the control and endometriosis groups.
5. The Cyst was formed in the endometriosis model, and its number was reduced by Visanne 0.3mg/kg.
6. We have successfully developed a Surgical Adhesion Model, paving the way for the evaluation of the efficacy of novel drugs.