A novel Post Traumatic Stress Disorder (PTSD) Model in the Jeju Minipig

J.H. Lee[1], K.H. PARK[1,2], T.H. KIM[1], B.Y. LIM[1], S.C. LEE[3], Y.J. SONG[3], P.J. SWEENEY[1], J.E. FRIEDMAN[1], L. C. PARK[1]

[1]Naason Science Inc. Cheongju, South Korea; [2]Kyungbuk National University, Daegu, South Korea; [3]Cronex Inc., Cheongju, South Korea
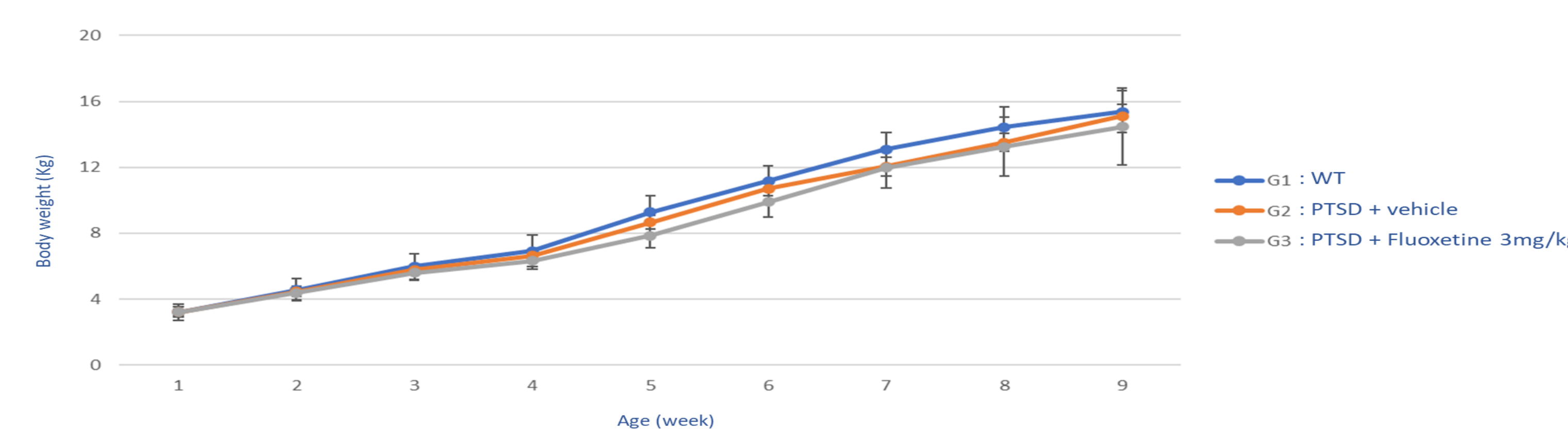
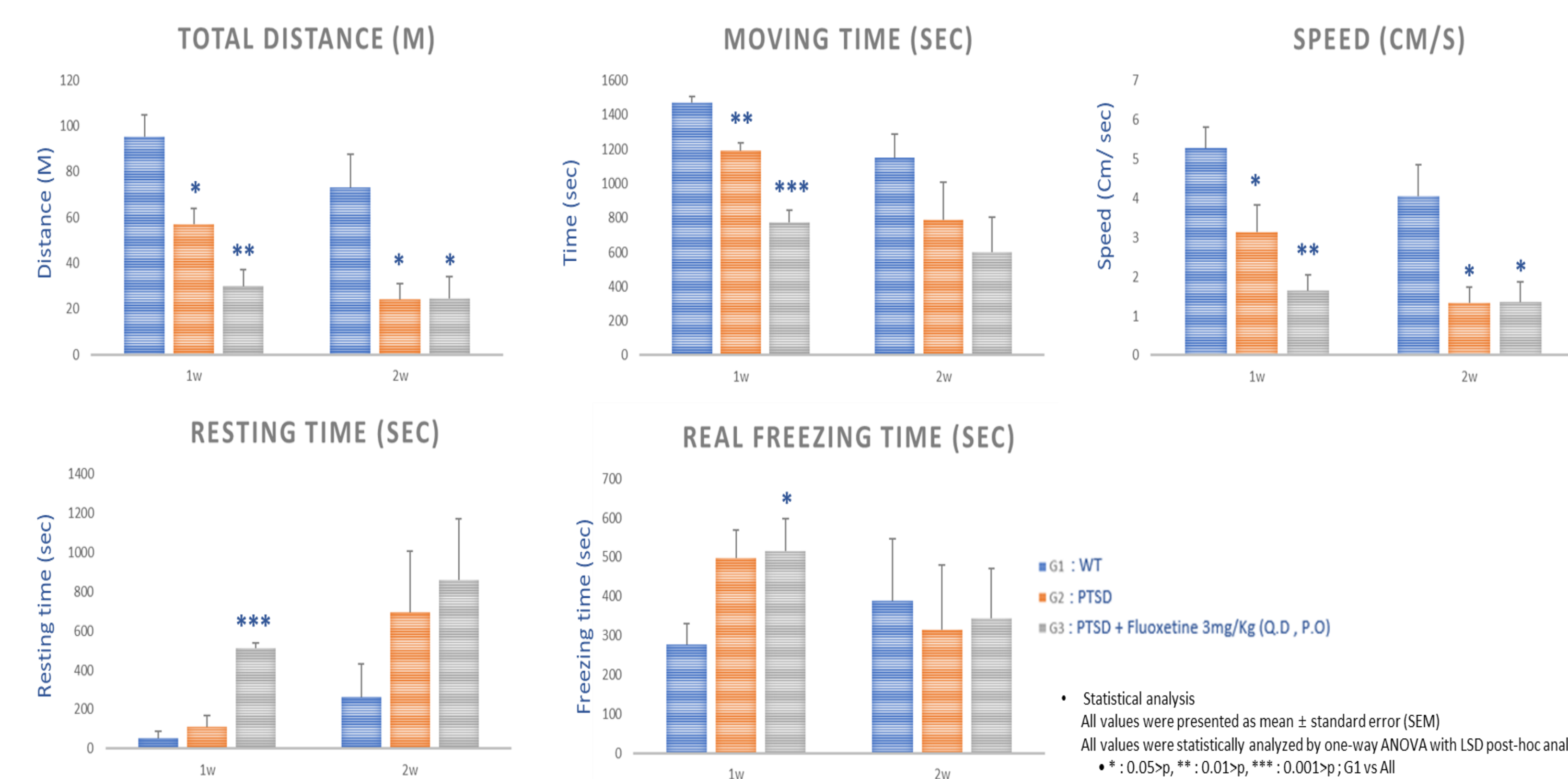**Presentation number 560.18**

BACKGROUND

PTSD is a serious condition that can lead to intense fear, anxiety and depression. Childhood exposure to highly stressful events has been found to increase the possibility that the adult will be more prone to suffer from PTSD. Current medication is not very effective and has a large number of side effects. As a result, many people continue to suffer from PTSD, indicating a critical need for new treatments. One limiting factor in the development of treatment for PTSD is the lack of valid, translational models. Naason Science has been developing models of PTSD in the rat and in the minipig, based on multi-faceted, prolonged stress paradigms, so as to test the efficacy of new compounds. Behavioral profiling analysis is employed capturing individual differences in response to trauma and treatment. We also expose the animals to stress as juveniles in order to increase their susceptibility to PTSD as adults. Pigs are intelligent animals that not only closely share physiology with humans, such as the cardiovascular system, but demonstrably show emotions, including fear. This is different from many animals that do not overtly express fear nor discomfort, making pigs viable candidates for behavioral studies.
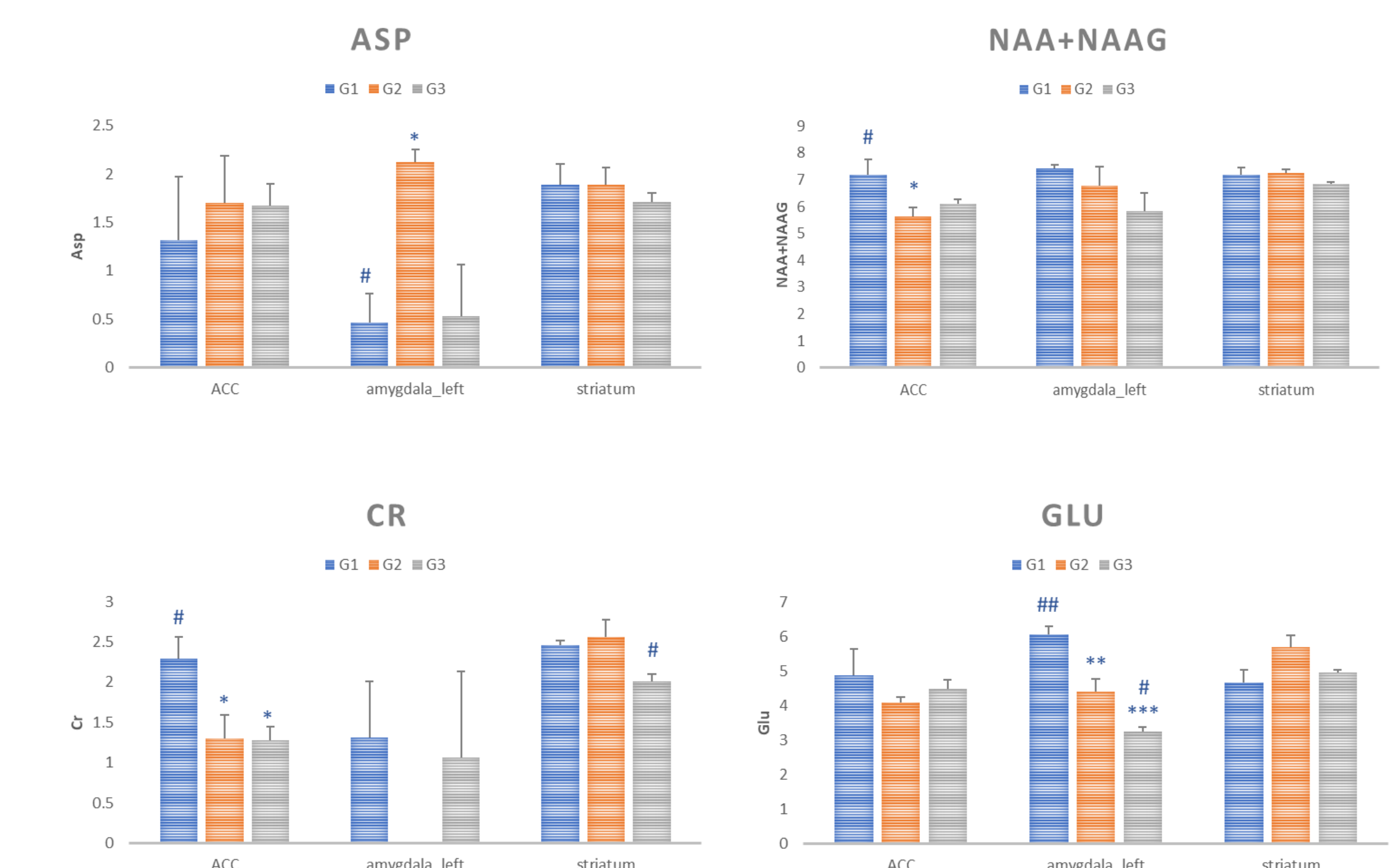
Study design

METHODS

Materials

- Animal: Jeju minipig
- Age: 1 weeks
- Stress induction : Restrain + Isolation(from mother)

- Group infromation
  ✓ Group1: Control(Wild type)
  ✓ Group2: PTSD model
  ✓ Group3: PTSD model + Fluoxetine 3mg/Kg(P.O., Q.D)

Recording & Analysis

- Recording: Intel realsense camera system(D435)
- Analysis: NAASON RADAR(Home-made video analysis S.W. by MatLab)

RESULTS

Body weight

Open fields test

Statistical analysis
All values were presented as mean ± standard error (SEM)
All values were statistically analyzed by one-way ANOVA with LSD post-hoc analysis
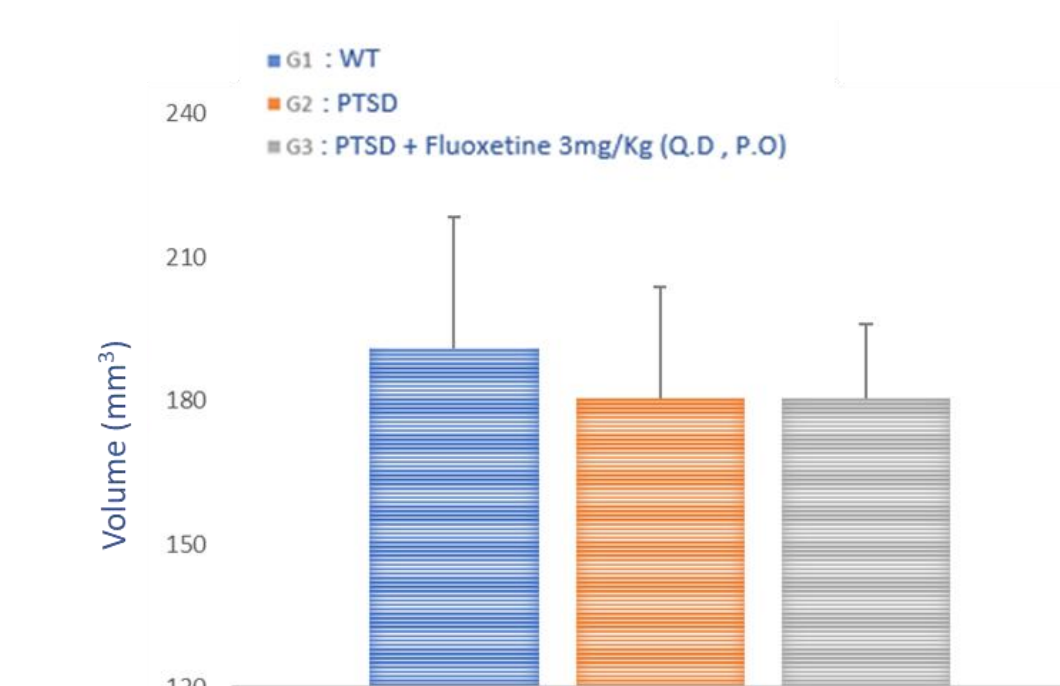* : 0.05>p, ** : 0.01>p, *** : 0.001>p; G1 vs All

Home cage analysis test

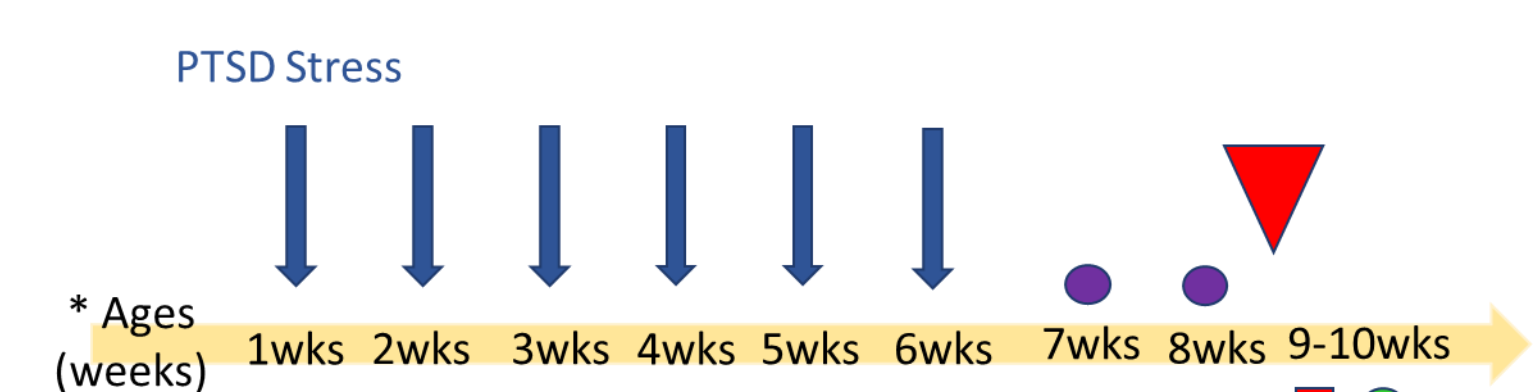### MRS (ACC/Amygdala/ Striatum)

MRI volume (Amygdala)

RESULTS & CONCLUSIONS

1. The body weight increased age dependently.
2. The total moving distance and time in the PTSD group decreased than the WT group at the open fields test.
3. The open fields test resting time in the fluoxetine group showed longer than in other groups.
4. The social distance by home cage analysis was shorter than in other groups.
5. The aspartate level increased in the PTSD group on the amygdala.
6. The NAA + NAAG and Cr level decreased in the PTSD group on the ACC region.
7. The glutamate level in the PTSD was decreased than in the WT group on the amygdala.
8. The PTSD group behavior phenotype differed from the WT, but the fluoxetine was ineffective in the PTSD model.