Introduction:
Depression is one of the worst diseases following cancer and AIDS in this century. World Health Organization (WHO) has already announced depression to be the most common human disease in the next 20 years. The monoamine hypothesis of depression suggests that one of the biological bases of affective disorders is a deficiency in the neurotransmitter serotonin (5-HT). During the past 40 yr, this hypothesis has been refined, as more experimental and clinical evidence has emerged. Recently, several researchers had discovered BDNF (brain-derived neurotrophic factor) played an important role of anti depression-like response in animals and decreased BDNF level in hippocampus of depressed patients. BDNF activation of brain derived neurotrophic factor receptor (TrkB) in turn activates several intracellular cascades, including the Ras-Raf extracellular signal-regulated kinase (Ras-Raf-ERK), phosphatidylinositol-3-kinase (PI3K), Akt, and phospholipase Cγ (PLCγ) pathways. These distinct pathways converge on activating the transcription factor, CAMP response element-binding (CREB), among many other actions. The aim of our study is to try to build a novel depressive-like animal model, which combined with both reserpine and the electrical stimulation to cause some mixed chemical and physiological stresses.

However, the understanding of its physiopathology relies on the availability of experimental models potentially mimicking the disease, thus we describe a model built up by selective 10-weeks old of C57BL/6 mice with strikingly different responses by the tail suspension test and elevated plus maze test for partially fitting clinical situation which cause depression from more than one pathway.

Materials and Methods:
Depression Animal Model:
The experimental mice of female C57BL / 6 mice from National Laboratory Animal Center were 8 ~ 9 weeks old and weighed about 25-30 g. All were housed in rearing environments: 12 hours a day (6:00 am~18:00 pm) artificial light cycle; room temperature in 24 ± 1 °C; humidity 55-65%; and adequate supply of food and water.

After one week environmental adaptation, they entered the experimental period. Accordingly, Reserpine injection (2mg/Kg) alone or in combination with electrical stimulation (0.8mA, 65sec/ cycle, total 300 cycles) were conducted, so that try to create remarkable diversity in depressive-like grade. All the acts of testing laboratories were performed in the daytime (10:00 am ~ 15:00 pm). The animal model build-up and design were shown on figure 1. and figure 2. for our anti-depression test.

Tail Suspension Test Design:
The tail suspension test (TST) has become the most widely used test in assessing antidepressant-like activity in mice. The test is based on the fact that animals subjected to the short-term, inescapable stress of being suspended by their tail, will develop an immobile posture.

Immobility is defined as the absence of initiating movements including passive swaying. Mice was positioned that the base of their tail was aligned with the bottom of the bar. Every mouse was given 1 trial that last 6 minutes. The total duration of immobility was calculated as the time the force of the mouse’s movements is below a preset threshold.

Results:

Figure 2. (A) Elevated Plus Maze test and (B) Tail suspension test(TST) of reserpine alone or combination.

The preliminary data demonstrated that whether reserpine alone or in combination with electrical stimulation could result in more than 10% and 15% increment in immobility time, respectively by tail suspension test.

Conclusion:
We build a novel depressive-like animal model, which combined with both reserpine and the electrical stimuli to cause some mixed chemical and physiological stresses. The understanding of its physiopathology relies on the availability of experimental models potentially mimicking the disease depression in clinic was conducted with by the tail suspension test and elevated plus maze test in our study.

References:

A New Depression-like Behavior Mouse Model Induced by Reserpine Injection Alone or in Combination with Electrical Stimulation
Tain-Junn Cheng1,2,3, Wan-Chen Tsai4, Kuan-Jung Chen4, Sheng-Yuan Zheng4, Chia Hui Cheng4, Cheng Chieh Hsu4, Jiunn-Jye Chuu4,*
1Department of Occupational Health and Neurology, Chi Mei Medical Center, Tainan, Taiwan.
2Department of Occupational Safety, College of Environment, Chia Nan University of Pharmacy and Science, Tainan, Taiwan.
3Department of Occupational Health, Medical College, National Cheng Kung University Hospital, Medical College, National Cheng Kung University, Tainan, Taiwan.
4Department of Biotechnology, Southern Taiwan University, Tainan, Taiwan.

* Supervisor

Figure 1. Design of animal model build-up.

Figure 3. (A) Elevated Plus Maze test and (B) Tail suspension test(TST) of reserpine alone or combination.

Figure 2. (A) Elevated Plus Maze test and (B) Tail suspension test(TST) of reserpine alone or combination.