

## S17-02

### CORTICAL MECHANISMS FOR EMOTIONAL FEAR AND CHRONIC PAIN

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Investigation of molecular and cellular mechanisms of synaptic plasticity is the major focus of many neuroscientists. There are two major reasons for searching new genes and molecules contributing to central plasticity: first, it provides basic neural mechanism for learning and memory, a key function of the brain; second, it provides new targets for treating brain-related disease. Here, I propose that LTP in the anterior cingulate cortex (ACC) as a synaptic model for emotional fear and chronic pain in the brain. Integrative approaches including genetic, neurobiological and physiological methods are used to investigate the roles of cortical neurons and microglia in synaptic LTP, fear and chronic pain. We have identified several key calcium-stimulated signaling molecules including AC1, CaMKIV and FMRP for AMPA receptor mediated cingulate LTP, trace fear memory, and chronic pain. By contrast, microglia only contributes to changes in spinal dorsal horn, but not in the cortex. Our findings strongly suggest that ACC LTP may serve as a cellular model for studying central sensitization that related to fear and chronic pain, as well as pain-related cognitive emotional disorders.