Acute stress induced modifications of calcium signaling in learned helpless rats

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Previous reports have demonstrated reduced elevations of free intracellular calcium concentration in blood cells of depressed patients after various stimuli. Therefore, a disturbance of intracellular calcium (Ca2+) homeostasis has been postulated to be involved in the pathophysiology of mood disorders. It was the aim of the present study to investigate whether Ca2+ signaling was affected in spleen T-lymphocytes of rats submitted to a learned helplessness paradigm, an animal model of depression with a high level of construct, face and predictive validity. In addition, we tested for effects of acute stress on the Ca2+ signaling in helpless rats, as compared to non-stressed rats. It was found that mitogen-induced Ca2+ signaling only tended to be reduced in helpless rats. However, when helpless rats were submitted to acute immobilization stress, Ca2+ signaling appeared to be significantly blunted, whereas the same stressor did not affect Ca2+ signaling in the non-helpless control rats. These acute stress-induced differences in Ca2+ signaling were not paralleled by a differential increase in plasma corticosterone. It is hypothesized that blunted Ca2+ signaling, as assessed in spleen T-lymphocytes of helpless rats, may be a correlate of the increased vulnerability of helpless rats to acute stressors.

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