

Keynote Speech: Mind, Metabolism, and Cancer

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Abstract

Chronic psychological stress and sleep deficiency are associated with poor prognosis in cancer patients. These risk factors induce negative physiological effects including anxiety, depression and circadian disruption that further contribute to tumor growth and cancer stemness. However, the mechanisms by which chronic stress and sleep deficiency promote cancer stemness remain elusive. Here, we find that chronic stress rewires glycolysis to facilitate stem-like traits in breast cancer. Moreover, targeting lactate dehydrogenase A with vitamin C significantly reverses chronic stress induced breast cancer progression and stemness. Meanwhile, sleep dysregulation reshapes fatty acid oxidation (FAO) rhythm to promote tumor growth and stem-like properties. Furthermore, rhythmic supplementation of a sleep-related hormone restores FAO rhythm to ameliorate lung cancer development. In summary, our findings reveal that chronic stress and sleep deficiency reprogram metabolism to accelerate cancer development, and provide metabolism intervening and chronotherapeutic strategies for cancer patients suffering from chronic stress and sleep deficiency.