Voluntary wheel running improves cardiac dysfunction associated with cancer cachexia induced by human stomach cancer cell line 85As2

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Cardiovascular disorders in cancer patients with cachexia have recently become a great concern. However, the relationship between cancer cachexia and cardiac dysfunction remains unclear, due to lack of suitable models. We established a novel murine model of cancer cachexia by implantation of human stomach cancer cell line 85As2, which represent anorexia, weight loss and low fat-free mass similar to those observed in cancer patients. In this study, we evaluated cardiac functions and investigated effects of voluntary wheel running (VWR) on cachexia-induced cardiac dysfunction using this model. 85As2 human stomach cancer cells were inoculated to male BALB/c nu/nu mice, which showed a symptomatic cachexia at 2 wks after implantation. By 8 wks after implantation, severe cardiac atrophy was developed and left ventricular ejection fraction (LVEF) was markedly reduced. VWR starting from 2 to 6 wks after implantation significantly suppressed the loss of heart weight as well as general symptoms of cachexia. Moreover, LVEF significantly increased in cachexia group with VWR, compared to those without VWR. These results suggest that our 85As2 cachexia mice model could be suitable for studying cancer cachexia with cardiac dysfunction. Additionally, VWR could improve cachexia-induced cardiac dysfunction, suggesting exercise on cardiac dysfunction in cancer patients with cachexia is a possible therapeutic approach.