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Rationale for HRP Directed Research: Research Impact/Earth Benefits: Task Progress: New project for FY2019. Bibliography Type: Description: (Last Undated: 06/16/2025)	Task Description:	 Spaceflight, by altering the differentiation program of hematopoietic and mesenchymal stem cells residing within bone marrow actualis in bone loss, increased bone marrow actiopoity, anemia, and impaired immune function. These closely associated disturbances may compromise the success of long-term missions. Thus, there exists an urgent need to identify the underlying mechanisms and implement effective countermeasures. Mice are currently the preferred animal model for evaluating adaptive responses to microgravity experienced during spaceflight and simulated spaceflight (e.g., hindlimb unloading). Mice have important advantages over other animal models for spaceflight studies, including small size and ease of genetic manipulation. Although mice and humans share many common characteristics, fundamental spaceflight. Humans are homeotherms and when exposed to a cold environment defend their core body temperature, whereas (i.e., temperature below thermoneutral). Mice are typically housed at or near roon temperature (-22°C), which is well below the thermoneutral zone for the species (-32°C). Therefore, mice must expend energy to maintain core body temperature. Cold stress induced by sub-thermoneutral housing increases sympathetic outflow to peripheral tissues, including brown adipose tissue, and has profound effects on metabolism. We have recently shown that cold stress induced by room temperature housing results. Strategies used by weight-bearing mice to minimize heat loss during room temperature housing room to postural adjustments) are less effective during spaceflight. This results in increased dependence on adaptive thermogeneis, likely exaggerating the negative physiological effects of skeleta in during spaceflight. This results in increased dependence con adaptive thermogeneis, likely exaggerating the negative physiological effects of skeleta in during spaceflight. This results in increased adaptive thermogeneis, likely cased on this finding. Specific Aim 1: Determine the c			
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