

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Human Physiology in Space (2)

Author: Prof. Satoshi Iwase  
Aichi Medical University, Japan

Dr. Kunihiko Tanaka  
Gifu University, Japan  
Prof. tadaaki mano  
Gifu University of Medical Sciences, Japan  
Dr. Yoshinori Wakita  
Aichi Medical University, Japan  
Dr. Naoki Nishimura  
Japan

BODY FLUID DISTRIBUTION DURING ARTIFICIAL GRAVITY AS A COUNTERMEASURE  
AGAINST SPACE FLIGHT DECONDITIONING USING A SEGMENTAL BIOELECTRICAL  
IMPEDANCE ANALYSIS**Abstract**

Long term spaceflight increases the risks of spaceflight deconditioning including cardiovascular deconditioning such as orthostatic intolerance. The causes of spaceflight deconditioning has not been clarified, however, it appears to be mainly caused by cephalic fluid shift. Therefore, body fluid shift to the lower body and legs by short radius centrifuge device inducing artificial gravity has been employed for countermeasures to ameliorate the spaceflight deconditioning. In order to quantitate the body fluid distribution change during artificial gravity we employed bioelectrical impedance analysis (BIA). We measured the body fluid distribution during artificial gravity of 1.0G at the heart level for 10 min using a BIA. The body fluids of the chest and upper arm area decreased transiently after the onset of centrifuge and remained low throughout the centrifuge period of 10 min. On the other hand, the body fluids of the abdomen area increased transiently after the onset of centrifuge and remained throughout the centrifuge period. The body fluid of the thigh area gradually increased during centrifuge period. Body fluid distribution after artificial gravity quickly returned to the initial level. We were able to confirm the fluids shift during artificial gravity using segmental BIA and provide more information on the indices of orthostatic intolerance after spaceflight, but the body fluid distribution of the Intracellular and extracellular fluid is a future challenge.