



### Location/Facilities

USARIEM is co-located with Soldier Systems Center in Natick, Massachusetts. Located a short distance from Boston, the institute offers researchers its own unique facilities and is in close proximity to many of the finest universities.



### Experimental Capabilities:

**Metabolic:** environmental chambers, dietary assessment, indirect calorimetry, doubly labeled water for energy expenditure, stable isotopes/metabolic flux.

**Body Composition:** DEXA (human & small animal), total body water, bone biomechanics.

**Performance:** cardiorespiratory responses to maximal & submaximal exercise, cognitive testing, vigilance/sleep/activity monitoring.

**Association of Assessment & Accreditation of Laboratory Animal Care:** animal care & surgery

**Biomechanical and Molecular:** analysis of mRNA & protein contents from both human & small animal models. Phospho-protein & cytokine analysis using LUMINEX technology. Micronutrient analysis using atomic absorption spectroscopy.



## Select Recent Scientific Publications

**Bathalon, G.P., McGraw, S.M.,** Sharp, M.A., Williamson, D.A., **Young, A.J.**, and Friedl, K.A. The effect of proposed improvements to the Army Weight Control Program on female Soldiers. *Mil Med*, 171(8): 800-805, 2006.

**Lieberman, H.R.** Cognitive methods for assessing mental energy. *Nutr Neuro*, 10: 229-242, 2007.

**McClung, J.P., Andersen, N.E., Tarr, T.N.,** Stahl, C.H., and **Young, A.J.** Physical activity prevents augmented body fat accretion in moderately iron deficient rats. *J Nutr*, 138(7): 1293-1297, 2008.

**Montain, S.J.,** Chevront, S.N., and Lukaski, H.C.. Sweat mineral element responses during 7 h of exercise-heat stress. *Int J Sports Nutr & Exerc Metab*, 17: 574-582, 2007.

**Pikosky, M.A., Smith, T.J.,** Grediagin, A., Castaneda-Sceppa, C., Byerly, L., Glickman, E.L., and **Young, A.J.** Increased protein maintains nitrogen balance during exercise-induced energy deficit. *Med Sci Sports Exerc*, 40: 505-512, 2008.

**Scrimgeour, A.G.,** Stahl, C.H., **McClung, J.P., Marchitelli, L.J.,** and **Young, A.J.** Moderate zinc deficiency negatively affects biomechanical properties of rat tibiae independently of body composition. *J Nutr Biochem*, 18(12): 813-9, 2007.

**Sigrist, L.,** Anderson, J.E., and Auld, G.W. Senior military officers' educational concerns, motivators, and barriers for healthful eating and regular exercise. *Mil Med*, 170(10): 841-845, 2005.



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United States Army Research Institute  
of Environmental Medicine



# Military Nutrition Division

Natick, Massachusetts



# United States Army Research Institute of Environmental Medicine

USARIEM is an internationally recognized center of excellence for Warfighter performance science and its useful applications. The institute functions as a world-class laboratory for environmental medicine, physiology, health and nutrition research. It features integrated cellular, tissue, and human research programs.



## Military Nutrition Division

Conducts research on nutritional issues affecting the health and fitness of service members, and supports the Surgeon General's responsibilities as the Department of Defense executive agent for nutrition. Evaluates new rations and examines the interactions between nutrition, performance and the environment.



## Primary Research Areas

- Bioenergetics
- Healthy Weight Management
- Combat Ration Testing



## Research in Progress

- Efficacy of nutritionally optimized first strike ration for sustaining physical and cognitive performance.
- The effect of amino acid supplementation on skeletal muscle protein turnover following endurance exercise.
- Efficacy of iron supplementation for the maintenance of iron status during basic combat training.
- Impact of dietary zinc on protein synthesis, bone health & immune function.
- Persistence of *Lactobacillus reuteri* DSM 17938 in the human intestinal tract.
- Sex differences in energy balance regulation.
- Over-the-counter Orlistat for weight loss: efficacy in overweight, active duty soldiers.



## Future Objectives & Challenges

### Operational Nutrition & Metabolism

- Exercise, Nutrition & Metabolism
- Nutrient requirements for cognitive work
- Satiety & hunger suppression
- Nutritionally enhanced resistance to disease & infection



### Healthy Weight Management

- Prevention
- Database tracking at risk & post-treatment personnel
- Risk factors: identifying, screening & modulation
- Weight loss interventions
- Differences in body weight regulation between men and women

### Ration Sustainment Testing

- Development of a nutrient database for all field rations

## Military Nutrition Division's Contribution to Products

### Ration and Supplements

First Strike Ration, Hooah, Ergo



## Doctrine & Training



## Performance enhancing food additives



## Nutrient Delivery System

