



Space Nutrition



Volume 3

The heavy part of weightlessness

Issue #1



Here's what you'll see - in Volume 3

Understanding and preventing the negative changes that occur during space flight is an important job. The Nutritional Biochemistry Lab (NBL) is involved in this – because good nutrition may be one way to help keep astronauts healthy during space flight. We will tell you all about the work going on in our area, and also what good nutrition means to you!

The NBL is part of a larger group here at the Johnson Space Center in Houston called the "Human Adaptation and Countermeasures Office" or HACO for short. It's a group of several laboratories working to understand the changes in the human body as it gets used to weightlessness. HACO scientists and engineers develop ways to stop the negative changes, using what we call countermeasures.

In each issue this year, we will also describe a different HACO laboratory, and will tell you a little about what it does. The HACO team of labs will play a key role in making it possible to safely send humans out on exploration missions to places like Mars – or beyond!

Curiosity Corner

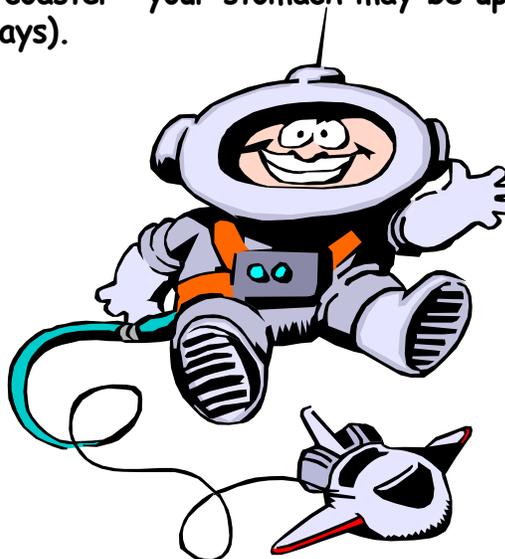
We want to hear from you

Send your comments or questions to:

Space Nutrition Newsletter
Nutritional Biochemistry Laboratory
Mail Code SK3
NASA - Johnson Space Center
Houston, TX 77058



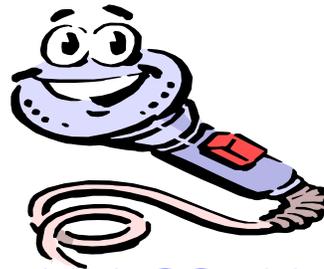
When flying in space, the human body senses that it is in a very different environment from the ground. You spend your whole life on the ground with gravity – and all of a sudden that changes. The body does a great job of quickly realizing this, and it starts to change to get used to this new world – a process we call adaptation. This affects almost every part of the body in one way or another: heart, muscles, bones, stomach, blood, even your inner ear (the part that helps you keep your balance). This can make the first few days of space flight very rough (sort of like living on a roller coaster – your stomach may be upset for a few days).



Most of these changes don't have a negative effect while in space, but some can have large effects when you land again. For example, your body needs less blood while weightless – probably because it is easier to get blood (and oxygen) to all parts of the body without gravity. However, when you come back to Earth, your body won't have enough blood, so we need to be careful that the astronauts don't faint on their return to Earth's gravity! The muscles also weaken during flight. While this doesn't matter while an astronaut is orbiting the Earth, it is very important for walking around after landing.

Did you know?

- The Expedition 7 crew is still on orbit on the International Space Station. Commander Yuri Malenchenko and Flight Engineer Ed Lu will be there until October, when they will return to Earth in a Soyuz vehicle bound for Russia.
- We were busy over the summer doing an experiment to understand the role of nutrition in the health of crew members living underwater for 14 days! They were in a small capsule 55 feet below the surface of the ocean, off the coast of Key Largo, Florida. We are still analyzing the blood and urine samples the "aquonauts" collected while they were down there – but the preliminary data look very exciting!
- The underwater mission was called NEEMO – for NASA Extreme Environment Mission Operations. This was the 5th NEEMO mission (and these started long before there was a fish by the same name!).



FUN CORNER

Find these words:

Exercise	Soyuz	Space
Muscle	Floating	Gravity
Skeleton	Nutrition	Shuttle
ISS	NEEMO	Blood
Experiment	Weightless	Countermeasure

R N O I T I R T U N L S W C
 S I L C N S M E Q E N H I Z
 M S O E U P V B A X U U O U
 E D E X P E R I M E N T Y Y
 C N O L I R S K N R D T G O
 L S E O T S P A O C R L N S
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 N E S F O R A I L E U X A E
 E R U S A E M R E T N U O C
 T X M V P M I V K W E J L V
 J U I E U A Y L S Q E X F N
 P T K E X M C P I K M A P X
 Y S Q N T G B E S S O R T H

Word of the Month

Aerobic

Can you guess what this word means? Look for the meaning of the "Word of the Month" in the next issue of Space Nutrition

Check out these cool NASA links for more fun space science facts!

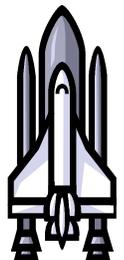
<http://www.nasa.gov/audience/forchildren/index.html>

<http://virtualastronaut.jsc.nasa.gov>

<http://lsda.jsc.nasa.gov>

<http://www.spaceflight.nasa.gov>

<http://spaceresearch.nasa.gov>



Check out the Nutritional Biochemistry Laboratory's website for more information about nutrition and space.

<http://haco.jsc.nasa.gov/biomedical/nutrition/>