

Word on Health

Consumer Health Information Based on Research from the National Institutes of Health

December 2003

The Low-Down on Osteoporosis

What We Know and What We Don't

by **Bobbi Bennett**

It's in our cereals, our orange juice, our bread. Manufacturers are adding calcium to all sorts of foods and beverages. That's because increasing the amount of calcium you consume daily can decrease your chances of fracturing a bone due to osteoporosis. Ten million people in the United States already have osteoporosis and 18 million more have low bone mass (osteopenia) and are at increased risk for developing osteoporosis.

The bones of a person with osteoporosis have become thin and fragile and are more likely to fracture. In the U.S., osteoporosis is responsible for more than 1.5 million fractures annually, 700,000 of them in the vertebrae of the spine and 300,000 in hips, at an estimated cost of more than \$14 billion each year. Other common fractures occur in wrists, forearms, feet and toes.

And according to Dr. Joan McGowan, director of the Musculoskeletal Diseases Branch of NIH's National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), the number of fractures in the U.S. is expected to increase in the next 40 years due to the increase in the average age of our population.

Many myths have sprung up about osteoporosis and its fractures that aren't based on solid science. While scientists don't yet have all the answers about the best ways to diagnose, treat or prevent osteoporosis, NIH, led by NIAMS, is conducting and supporting research to help find those answers. Here's what we know now about some of those myths.

Myth: Our bones don't change after we have finished growing.

We reach our peak bone mass around age 30 but our bones are changing constantly throughout our lives. This process—known as remodeling—involves two major types of bone cells: osteoclasts, which break down old or worn bone and thus create bone cavities,

Inside Word

- 1 Low-Down on Osteoporosis
- 5 Reduce the Risk of SIDS
- 7 Household Products Database
- 8 Heart Healthy Cookbook
- 9 Research Capsules:

Physical Activity for Weight Loss

Heart Stem Cells Identified

Women's Heart Attack Signs

New Drug to Suppress Immune System

- 12 New and Notable

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and osteoblasts, which fill in the cavities. If the amount of new bone equals the amount being dissolved, your bones stay strong. But several things can shift the balance so that bones become weaker and more brittle (see "Risk Factors for Osteoporosis" on page 3).

Myth: We know all the risk factors for osteoporosis.

"We don't have a complete set of risk factors that describe a person who is at very high risk for fracture," says Dr. McGowan. One of the biggest risk factors, she points out, is age. "Forty to fifty percent of women over 50 will have an osteoporotic fracture sometime in their life," she says. "As you age, your bones become less dense and weaker due to an increased rate of bone loss—the osteoclasts are breaking down more bone than the osteoblasts are filling in. Younger people ice skate or ski and, without severe trauma when they fall, they don't break any bones. We get older, do the same activities and fall, and we do suffer a fracture."

We also know that being a woman makes a big difference, too. Women have an increase in the rate of bone loss during the first three to five years after menopause. After that, it continues at a slower but steady rate.

NIH is now funding several studies to learn more about how and why bones become fragile and fracture.

Continued on page 2

Continued from page 1

Myth: A DXA scan can predict whether or not you will have a fracture.

A DXA scan, a special type of x-ray exam, is used to measure the bone mineral density (BMD) of the spine or hip. BMD is used as a common indicator of bone health. But BMD is just one component of bone strength and is not the perfect marker for gauging a person's risk of fracture.

"There is a lot more about the quality of bone that isn't captured by DXA," says Dr. McGowan. "Yet DXA is as good at predicting fracture as blood pressure measurement is at predicting stroke and better than cholesterol numbers at predicting heart disease. However, just because you have normal blood pressure doesn't mean that you won't have a

stroke, or just because you have normal cholesterol levels doesn't mean that you are protected from having a heart attack. There are many different risk factors involved for those diseases and the same is true for osteoporosis and for fractures."

NIH-funded investigators are now working to develop ways to measure bone strength and quality that, coupled with some simple risk factors like age and previous fractures, could more accurately predict a person's fracture risk.

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Myth: You can't get all the calcium you need from food.

On the contrary, Dr. McGowan says it is best to get your daily amounts of calcium from food whenever possible. "You won't have to worry about getting enough calcium, vitamin D and vitamin K," she explains, "if you

Continued on page 3

The Word on NIH

The National Institutes of Health (NIH) is one of the world's premier biomedical research organizations. A government agency within the U.S. Department of Health and Human Services, NIH is composed of 27 Institutes and Centers, each with its own research focus.

NIH supports and conducts medical research to understand how the human body works and to gain insight into diseases and disorders. NIH translates research results into medical interventions and distributes current medical information to patients, health care providers and the general public.

NIH provides leadership and financial support to researchers in every state and throughout the world, investing billions of dollars in scientific research each year. About 10% of NIH's budget supports over 2,000 research projects in its own laboratories. Most of its budget, however, is awarded through almost 50,000 competitive grants and contracts to researchers at over 2,800 hospitals, universities, medical schools, and other research institutions.

NIH's own scientists, and scientists working with support from NIH grants and contracts, have made countless medical advances in the last century. More than 100 of these scientists have received Nobel Prizes in recognition of their achievements.

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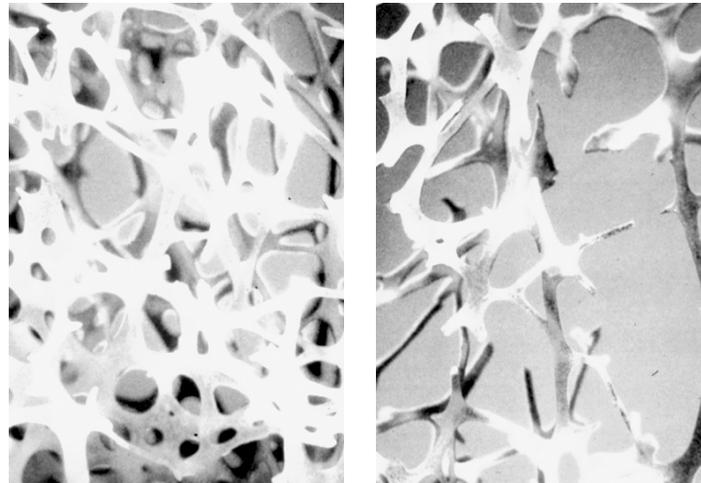
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Continued from previous page

eat a balanced diet of fruits, vegetables—especially leafy green ones—grains, protein, and low-fat dairy products.” And with so many calcium-fortified products on the market, it’s getting easier all the time to get all the calcium you need from food.

If you can’t get enough calcium from your diet, you may need a calcium supplement. They come in different forms, such as calcium carbonate and calcium citrate. Dr. McGowan says there is no significant difference among the various forms. So if one type seems to disagree with you, switch to another. Check your supplement’s label to ensure that your calcium supplement meets USP standards. (USP, or the U.S. Pharmacopeia, is an organization that helps ensure consumers receive quality medicines by setting standards that drug manufacturers must meet.)

Men and women between the ages of 19 and 50



Normal bone (left) is dense and strong whereas osteoporotic bone (right) is thin and brittle and can fracture easily. Images courtesy of the National Osteoporosis Foundation

should get about 1,000 milligrams (mg) of calcium daily while those over 50 should get 1,200 mg. Dr. McGowan recommends spreading out the calcium over the day so that you get better overall absorption of the calcium, and taking it with food helps, too.

You also need enough vitamin D every day in order to absorb calcium from the diet. Vitamin D is found in food, particularly fortified food, but can also be made by your body after exposure to the sun; 15 minutes outside in

the sun per day is usually sufficient for your body to make all the vitamin D you need. If you have limited sun exposure, especially during the winter, you should take vitamin pills with 200 to 400 international units (IU) of vitamin D per day if you are below age 70, or 600 IU if you are over 70. Too much vitamin D can be harmful, so don’t take more than 800 IU per day without a doctor’s supervision.

Risk Factors for Osteoporosis

Ones You Can’t Change:

- Being a woman
- Getting older
- Being Caucasian or Asian; however, African American and Hispanic women are also at risk
- Having a family history of fractures

Ones You Can Change:

- Low estrogen levels in women; low testosterone levels in men
- Anorexia
- Lifetime diet low in calcium and vitamin D
- Use of medications such as steroids you take by mouth, or some anticonvulsants
- Inactive lifestyle or prolonged bed rest
- Cigarette smoking
- Excessive use of alcohol

Myth: We have highly effective drugs to prevent and treat osteoporosis.

The U.S. Food and Drug Administration (FDA) has approved several medications for the prevention or treatment of osteoporosis. However, Dr. McGowan cautions, “None of these can completely stop fractures and may not be suitable for taking the rest of your life since we don’t yet know what their long-term effects are.”

Millions of women were taking estrogen along with progestin—known as hormone replacement therapy or HRT—beginning at menopause, and planning to continue it for the rest of their lives. “Estrogen used to be considered a sheet of armor for your bones,” Dr. McGowan says. But NIH’s long-term clinical trial, the Women’s Health Initiative (WHI), revealed last year that, although estrogen and progestin combined to prevent fractures, the overall health risks of taking HRT outweighed the benefits. (For more on the WHI, go to <http://www.nih.gov/PHTindex.htm>.)

Another part of the WHI that is not scheduled to be completed until 2005 is investigating the effect of

Continued on page 4

Continued from previous page

1,000 mg of calcium carbonate plus 400 IU of vitamin D daily on hip and other osteoporosis-related fractures and colorectal cancer. Until these studies are finished, women should consult their doctor or health care provider about the risks and benefits of the various options available for treating or preventing osteoporosis.

There are several FDA-approved medications available. Most inhibit the osteoclasts, the cells that break down bone; only one, teriparatide, actually stimulates the growth of new bone. These drugs have not been available for very long, so we don't yet know all their long-term effects. Here is a brief description of each:

- Teriparatide (brand name Forteo®) is a synthetic form of human parathyroid hormone (PTH) that FDA has approved for the treatment of osteoporosis in postmenopausal women at high risk of fracture. This drug must be injected daily for no longer than two years.
- Two drugs in a class known as bisphosphonates, alendronate (brand name Fosamax®) and risedronate (brand name Actonel®), reduce the risk of fractures in postmenopausal women with osteoporosis and now come in a once-a-week pill. Both can cause problems in your stomach and esophagus (the tube that connects the mouth with the stomach) if not taken with 6 - 8 ounces of water and if you do not remain upright for 30 minutes after taking it.
- Raloxifene (brand name Evista®) mimics estrogen's positive effects on bone without the negative effects on the breast or uterus. It prevents bone loss and reduces the risk of vertebral fractures. However, it could cause blood clots and hot flashes.
- Calcitonin (brand names Miacalcin® and Calcimar®) is a synthetic protein similar to a hormone made by the thyroid. It is approved for treating osteoporosis in women at least five years beyond menopause. It can be taken as a daily nasal spray or by injection under the skin. Calcitonin increases spinal bone density but its effects on fracture risk are still unclear. The nasal form has few side effects but may not be as effective as the injected one, which may cause an allergic reaction.

NIAMS is funding trials to test various combinations of these drugs. Recently, a trial of PTH and alendronate showed that the concurrent combination provided no additional improvement in BMD than PTH alone. Ongoing studies will determine whether the sequential use of the two drugs is superior to just one of the drugs. NIAMS and several other NIH components are investigating other agents for preventing or treating osteoporosis as well. These include statins (cholesterol-lowering drugs), phytoestrogens (chemicals found in plants that can act like estrogen), and nitric oxide (a drug given to heart patients in the form of nitroglycerin).

A Word to the Wise... What You Can Do to Prevent Osteoporosis

- Get enough calcium: Kids ages 8 -18 need 1,300 mg; adults 19 - 50 need 1,000 mg; those over 50 need 1,200 mg. Don't exceed 2,000 mg per day.
- Take calcium with meals; the body absorbs it better that way and you are more likely to remember to take it. Buy fortified orange juice and cereals, and eat lots of green leafy vegetables and low-fat dairy products like cheese, milk, ice cream and yogurt.
- If you can't get enough calcium through foods, take calcium supplements from well-known manufacturers. Be wary of supplements from "natural sources."
- It's best to take only 500 mg of calcium at a time if you can.
- Get enough vitamin D. Spend 15 minutes outside in the sun each day or take 200 to 400 IU below age 70 and 600 over 70.
- Get out of that chair and walk or do other weight-bearing exercises like jogging, dancing, or tennis.

Final Advice

Dr. McGowan has one last recommendation: Do regular weight-bearing exercise, such as walking, jogging, stair-climbing, tennis, weight-training and dancing. These activities may not only help strengthen your bones; they can build muscle and help with your balance, reducing your risk of falling. As doctors are learning with many other functions of the body, use it or lose it—in this case, exercise or lose your bone and muscle strength. ♦

For more information about osteoporosis, go to <http://www.osteoporosis.org/> or contact the NIH Osteoporosis and Related Bone Diseases~National Resource Center at: NIH ORBD-NRC
1232 22nd Street, NW
Washington, DC 20037-1292
Phone: 800-624-BONE or 202-223-0344
TTY: 202-466-4315
FAX: 202-293-2356
E-Mail: orbdnrc@nof.org

Reduce the Risk of SIDS

Crucial Advice for New Parents

by Mary Sullivan

If you're a new parent, you want to do everything you can to keep your baby healthy. You probably already know that putting your baby to sleep on his or her back will reduce the risk of Sudden Infant Death Syndrome (SIDS), the sudden and unexplained death of a baby under one year of age. But did you know that placing an infant to sleep on his back can be good for your baby's health in other ways, too? New research findings go beyond earlier studies that showed there were no adverse effects from placing babies to sleep on their backs.

"Placing infants to sleep on their backs not only reduces their risk of SIDS, but also appears to reduce the risk for fever, stuffy nose, and ear infections," says Dr. Duane Alexander, director of NIH's National Institute of Child Health and Human Development (NICHD). That's good news for parents who may still have reservations about placing infants to sleep on their backs.

Unexplained Infant Deaths

SIDS deaths are associated with sleep, but no one knows the cause of these unpredictable and sudden deaths. Approximately 3,000 infants die each year of SIDS in the United States.

Before research identified a link between sleep position and SIDS, it was common practice to place babies on their stomachs to sleep. Some parents feared that an infant sleeping on his or her back is more likely to choke or vomit. Others believe that infants sleep better on their stomachs. Until a few years ago, many doctors advised parents to place their babies on their stomachs to sleep, because it was believed to be less risky than other sleep positions. Some studies estimated

that in 1992, up to 70% of infants were being placed to sleep on their stomachs.

But research has since found that back-sleeping is the safest position. In the early 1990s, several studies showed that babies placed on their stomachs were much more likely to die of SIDS than babies placed on their back or side. Although babies placed on their sides often roll onto their backs, some roll onto their stomachs. Based on research studies, the American Academy of Pediatrics now recommends back-sleeping for infants under one year of age to reduce the risk of SIDS.

"A number of studies have shown the importance of educating parents and caregivers about continuing to put infants to sleep on their back throughout the first year of life," Dr. Alexander says.

In 1994, NICHD launched the *Back to Sleep* campaign to do just that. By the late 1990s, only 17% of babies were being placed on their stomachs. Since the campaign began, SIDS has decreased by 50%.

Risk Factors

Researchers have found several other risk factors that place certain people at higher risk for SIDS than others.

African American babies, for example, are more than twice as likely to die from SIDS as white babies. Researchers think this could be due, at least in part, to the fact that African American infants are placed to sleep on their stomachs more often than other infants.

According to previous studies, over 40% of black infants sleep on their stomachs, compared with about 25% of babies overall. One NICHD-funded study found that African Americans are less likely than other groups to be advised by their doctors to avoid placing their infants on their stomachs.

American Indian babies are more than three times as likely to die from SIDS as white babies. One study of Northern Plains Indians funded by NICHD and other Federal agencies associated maternal alcohol use during the first trimester with increased rates of SIDS,

Did you Know That...

- SIDS is the leading cause of death in babies after 1 month of age.
- Most SIDS deaths happen in babies between 2 and 4 months old.
- More SIDS deaths happen in colder months.
- Babies placed to sleep on their stomachs are much more likely to die of SIDS than babies placed on their backs to sleep.
- American Indian babies are over three times as likely to die of SIDS than Caucasian babies.
- African American babies are more than twice as likely to die of SIDS than Caucasian babies.

Sources: National Institute of Child Health and Human Development, Centers for Disease Control and Prevention's *National Vital Statistics Reports*.

Continued on page 6

Continued from previous page

and also found that infants were more likely to die of SIDS if they wore two or more layers of clothing while they slept. Other studies also support the finding that keeping a sleeping child too warm may increase the risk of SIDS.

According to NIH researchers, infants who share a bed with other children are at higher risk for SIDS. Other studies have found that infants who sleep on soft bedding, such as sheep skins, pillow, quilts, or soft mattresses are five times more likely to die of SIDS than infants who sleep on firm bedding in their own sleep area, such as a crib. Sleeping on a sofa appears to be especially dangerous, but researchers don't know why.

When two or more risk factors are present, the risk can go up even more dramatically. Babies who are put to sleep on their stomachs and on soft bedding can be as much as 21 times more likely to die of SIDS.

Because many of the known risk factors for SIDS can be avoided, families need to learn how to reduce the risk of SIDS. To learn more, read the accompanying box *What You Can Do To Lower the Risk of SIDS*.

Other Benefits

If parents want more proof about the benefits of



back-sleeping, consider the fact that babies placed to sleep on their backs also are less likely to develop fevers, stuffy noses, or ear infections. This finding is the result of research funded by both NICHD and NIH's National Institute on Deafness and Other Communication Disorders (NIDCD). Researchers found that at one month of age, infants sleeping on their backs were less likely to come down with a fever, and at six months of age were less likely to develop stuffy noses than stomach sleepers. At both three and six months, back sleepers needed to visit the doctor less often for ear infections than stomach sleepers.

"Ear infections are quite common in infants and young children, and as many parents know, can be a cause of concern, especially when they occur during the first few months of life," says Howard Hoffman, director of NIDCD's Epidemiology and Biostatistics program.

Infants who have ear infections early in life are more likely to have chronic infections, which can result in hearing loss. As several studies have now shown an association between sleep position and ear infections, Hoffmann says, "This is more evidence for parents to put infants to sleep on their backs."◆

A Word to the Wise...

What You Can Do To Lower the Risk of SIDS

Although there is no way to know which babies might die of SIDS, there are some things that you can do to make your baby safer.

- Always place your baby on his or her back to sleep, even for naps.
- Place your baby on a firm mattress, such as in a safety-approved crib.*
- Remove soft, fluffy and loose bedding and stuffed toys from your baby's sleep area.
- Make sure your baby's face and head stay uncovered during sleep.
- Do not allow smoking around your baby.
- Don't let your baby get too warm during sleep.
- Make sure everyone who cares for your baby knows to place your baby on his or her back to sleep.

*For more information on crib safety guidelines, call the U.S. Consumer Product Safety Commission at 1-800-638-2772 or visit their web site at www.cpsc.gov.

Source: National Institute of Child Health and Human Development

For more information on sleep positions for babies and reducing the risk of SIDS, contact the Back to Sleep campaign at 1-800-505-CRIB or: 31 Center Drive, Room 2A32 Bethesda, MD 20812-2425 Fax: 301-496-7101 Web site: www.nichd.nih.gov

For more information on ear infections in young children, contact: NIDCD Clearinghouse Voice: 1-800-241-1044 TTY: 1-800-241-1055 E-mail: nidcdinfo@nidcd.nih.gov Web site: www.nidcd.nih.gov

Household Products Database

Information On Health and Safety of
Everyday Products

submitted by **Colette Hochstein**

What's under your kitchen sink, in your garage, in your bathroom, and on the shelves in your laundry room? Do any of the household products you use pose a potential health risk to you and your family? A new online consumer guide from NIH's National Library of Medicine (NLM) provides easy-to-understand information on the potential health effects of more than 4,000 common household products.

Many household products contain substances that can pose health risks if they are ingested, inhaled, or come into contact with your eyes and skin. The new Household Products Database at <http://householdproducts.nlm.nih.gov> provides information on



these substances and their potential health effects in language that's clear and easy to understand. And if you want more technical information, you can follow links directly into NLM's more technical databases on toxicology, hazardous chemicals, and other topics.

For many years, NLM has been providing databases for toxicologists and other

scientists. The Household Products Database, however, is for both scientists and the general public. This database allows you to browse a product category, such as 'Pesticides' or 'Personal Care,' by alphabetical listing or by brand name. You can also search for products by type, manufacturer, product ingredient, or chemical name.

For example, say you're trying to decide which algae-killing product to use in your swimming pool. You can select the "Landscape/Yard/Swimming Pool" category in Household Products and click on "algaecide." You can then browse through several brands to look for chemical content and possible health hazards.

The Household Products Database can help you answer questions like:

- What chemicals are found in a specific product, and in what percentages?
- What are the potential health effects of the ingredients in a specific brand?
- Which products contain a specific chemical you are concerned about?
- Who manufactures a specific brand, and how can the manufacturer be contacted?
- What other information about a chemical can you find in other NLM databases?



Information for the Household Products Database comes from a variety of publicly available sources, including brand-specific labels and information provided by manufacturers and manufacturers' web sites. The record for each product shows ingredients from the Material Safety Data Sheet (MSDS). Designed to provide workers and emergency personnel with the proper procedures for handling or working with a particular substance, MSDS sheets are required by federal law from manufacturers.

Initial selection of products in the Household Products Database was based on market share within each product category, and on-shelf presence in retail stores in the Washington, D.C. and San Francisco areas. NLM plans to continue adding more brands to the existing seven categories (Auto Products, Pesticides, Landscape/Yard, Personal Care, Home Maintenance, Hobbies, Home/Inside).

Based primarily on user feedback, NLM will also continue to add new types of products to the Household Products Database as well as work to keep the existing information in the database current and accurate. ♦



Visit the Household Products Database at <http://householdproducts.nlm.nih.gov>.

For more information about this and other databases from NLM's Division of Specialized Information Services, please contact: tehip@tehl.nlm.nih.gov.

New Cookbook Serves Up Heart Healthy Treats

By Carol E. Torgan, Ph.D.

A colorful new little book offered by NIH's National Heart, Lung, and Blood Institute (NHLBI) takes aim at heart disease by serving up a collection of recipes and tips based on years of research, clinical studies, and educational programs.

"These quick and easy recipes, which are based on the science of heart-health, are geared for the whole family. They are reminiscent of the wonderful food you might find on your grandmother's table," says Karen Donato, coordinator of NHLBI's Obesity Education Initiative.

The 145 page book, *Keep the Beat, Heart Healthy Recipes*, contains recipes such as "Zucchini Lasagna," "Crispy Oven-Fried Chicken," and "Apple Coffee Cake" that are low in calories but high in taste. The recipes are reduced in saturated fat, cholesterol, and sodium, and come complete with detailed nutritional information. A wide range of ethnic cuisines offers a taste for every palate, whether you're looking for appetizers, main dishes, side dishes, breads, or desserts. Even kids will be tempted by updated favorites like "Delicious Oven French Fries" and "Classic Macaroni and Cheese."

"This inexpensive book offers a wide variety of our most frequently requested recipes all in one place," said Janet Kelly, an NHLBI nutrition education specialist.

In addition to over 100 recipes, the book contains morsels of useful information such as how to read nutrition labels, what a serving size really is, and simple substitutions that are heart-friendly. It also contains information on how what you eat can help you to control three key risk factors for heart disease: overweight and obesity, high blood pressure, and high blood cholesterol levels. The tips provide a perfect guide for setting healthy new years' resolutions.

Keep the Beat, Heart Healthy Recipes makes a great gift for the holidays. "Crunchy Pumpkin Pie" and "Garlic Mashed Potatoes" may soon become favorites at your holiday table. ♦

Keep the Beat, Heart Healthy Recipes can be downloaded free of charge at http://www.nhlbi.nih.gov/health/public/heart/other/ktb_recipebk/index.htm. Printed copies are available for \$4.00 through the Website or from the NHLBI

Information Center at P.O. Box 30105, Bethesda, MD 20824-0105, 301-592-8573 or 240-629-3255 (TTY).

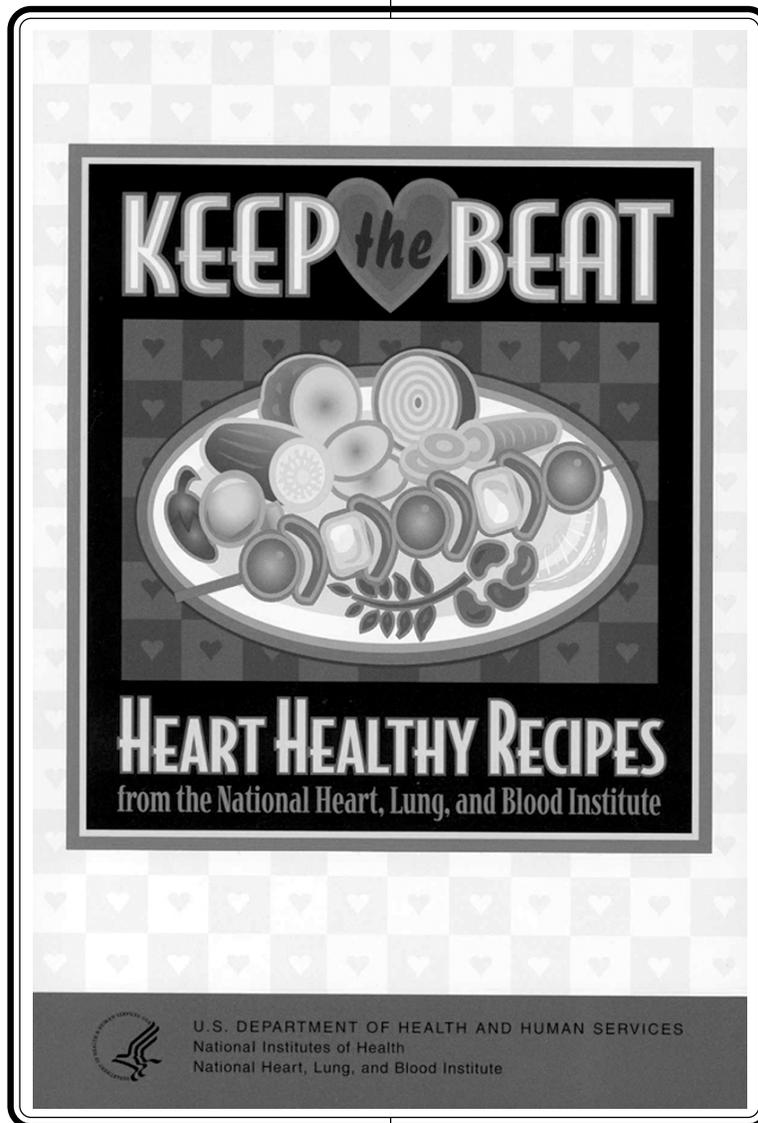
To learn more about heart health visit NHLBI online at: www.nhlbi.nih.gov

For information about how to lose extra pounds or maintain a healthy weight, visit: http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm.

To learn about high blood pressure, visit http://dci.nhlbi.nih.gov/Diseases/Hbp/HBP_WhatIs.html.

To learn about high blood cholesterol, visit www.nhlbi.nih.gov/chd.

To learn about heart health for women, visit <http://www.nhlbi.nih.gov/health/hearttruth/index.htm>.



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health
National Heart, Lung, and Blood Institute

Research Capsules

by Harrison Wein, Ph.D.

Physical Activity for Weight Loss

You've heard that physical activity is important for losing weight. But how much activity? According to a new study supported by NIH's National Heart, Lung, and Blood Institute (NHLBI), women trying to lose weight can benefit as much from moderate physical activity as from an intense workout.

Researchers enrolled 201 sedentary and overweight but otherwise healthy women, ages 21-45, in a trial to test different physical activity regimens. All the women received reduced-calorie meals, and each was randomly assigned to one of four physical activity regimens. The regimens involved either a moderate or vigorous physical activity for either a shorter (2½ to 3½ hours per week) or longer (3½ to 5 hours per week) time. The women were given treadmills and encouraged to walk briskly for at least 10 minutes at a time, but they were free to do other exercise if they preferred.

Women in all four of the groups lost a significant amount of weight over a period of 12 months—from eight to 10 percent of their body weight, on average. They also improved their general fitness levels. However, there were no significant differences in weight loss or fitness improvement between the four groups.

The Centers for Disease Control and Prevention (CDC), NIH's sister agency in the Department of Health and Human Services, recommends that people get a minimum of 30 minutes of moderate-intensity activity on most days, for a total of about 150 minutes per week. The authors of this study recommend that people try to get at least that amount.

This research shows that, with a diet reduced in calories and fat, physical activity of moderate intensity is enough to help overweight people lose weight. The key is not how intense your physical activity is, but how much total energy you burn in the end. ♦

Source: *JAMA* 290,10:1323-1330

For more information on losing and controlling your weight, visit http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm or contact:

NHLBI Health Information Center
P.O. Box 30105
Bethesda, MD 20824-0105

Phone: 301-592-8573

TTY: 240-629-3255

Fax: 301-592-8563

NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) also has resources to help you lose or control your weight. Visit <http://www.niddk.nih.gov/health/nutrit/nutrit.htm> or contact:

Office of Communications and Public Liaison, NIDDK, NIH Building 31, Room 9A04 Center Drive, MSC 2560 Bethesda, MD 20892-2560

Heart Stem Cells Identified

The heart has long been considered an organ that wasn't able to renew itself. But a new study shows that the adult heart may contain stem cells that have the potential to regenerate tissue when the heart is damaged, such as during a heart attack. Scientists now hope to harness these cells to develop new therapies to repair damaged hearts.

Most researchers had assumed that the heart had a relatively stable number of fully developed, specialized heart muscle cells from shortly after birth well into adulthood. But in the past few years, stem cells (cells with the potential to transform into other cells in the body and replenish them) have been found in many adult tissues, including the brain. Recent studies suggested that stem cells may also contribute to a process of cell death and renewal in the heart.

A team of researchers supported by NIH's National Heart, Lung, and Blood Institute (NHLBI) and National Institute on Aging (NIA) took heart muscle from older rats and isolated cells they believed might be stem cells. They were able to grow these cells in the laboratory for well over a year, and could also successfully freeze and thaw them, important characteristics for any cells that might be used as a therapy. When the cells were prompted to transform into heart cells, the cells displayed some of the chemical characteristics of three different types of heart cells, although they seemed to be immature forms of the cells when viewed under the microscope.

The researchers next injected the cells into damaged rat hearts to see what they would do. They found that the cultured cells grew into different types of heart cells. Moreover, the cells seemed to hone in on the damaged areas of the rats' hearts. Within 20 days, the damaged areas started to function again, and

The key is not how intense your physical activity is, but how much total energy you burn in the end.

Continued on page 10

Continued from previous page

the rats' overall heart function improved.

These types of cells have been found not only in rats, but also in mice, dogs, pigs and humans. In another recent study, the research team looked at people who died after aortic stenosis (the narrowing or obstruction of the heart's aortic valve) and found that new heart cells were being created by similar cardiac stem cells.

So if these stem cells are already in the heart, why don't they mobilize and repair the heart when it's damaged? That is a question the researchers hope to answer soon. If the regenerative power of these cells could be harnessed, they might form the basis for an effective therapy to treat heart damage. ♦

Source: *Cell* 114:763-776, *Proceedings of the National Academy of Sciences* 100,18:10440-10445

For more information about stem cells, see the *NIH Stem Cell Backgrounder* at <http://www.nih.gov/news/backgrounders/index.html>.

For more information on aortic stenosis, visit <http://www.nlm.nih.gov/medlineplus/ency/article/000178.htm>.

For general information on heart disease, visit <http://www.nhlbi.nih.gov/health/public/heart/index.htm> or contact:

NHLBI Health Information Center

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P.O. Box 30105

Bethesda, MD 20824-0105

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Women's Heart Attack Signs

A new study—one of the first to look at symptoms before and during heart attacks in women—found that fewer than 30% of women reported chest pain and discomfort prior to a heart attack, and 43% didn't experience chest pain during one. Most doctors consider chest pain the most important heart attack symptom for both men and women, but the women's most frequently reported early warning symptoms were unusual fatigue (70.7%), sleep disturbance (47.8%), and shortness of breath (42.1%). This finding may help women and their doctors more accurately identify the early warning symptoms of a heart attack so that they can better forestall or prevent the attacks.

The current description of "typical" cardiac

symptoms is based primarily on the experience of white, middle-aged men. Researchers funded by NIH's National Institute of Nursing Research (NINR) set out to find if women have the same symptoms. They asked 515 women who had been diagnosed with a heart attack, called an acute myocardial infarction (AMI), within the previous 4 to 6 months about their symptoms prior to their AMI. The researchers found that 78% of the women had at least one of a number of symptoms (see box) either daily or several times a week for at least one month prior to their heart attack. The two most frequent symptoms, fatigue and sleep disturbances, were most likely to be rated as severe.

Perhaps most surprising is that 43% of the women said they didn't experience any type of chest discomfort with their AMI. A lack of major chest pain may be a major reason why women have more unrecognized heart attacks than men. The women in this study who experienced chest discomfort more often described it as aching, tightness or pressure rather than pain.

Women's Heart Attack Signs

Major symptoms preceding a heart attack in order of reported frequency include:

- Unusual fatigue - 70%
- Sleep disturbance - 48%
- Shortness of breath - 42%
- Indigestion - 39%
- Anxiety - 35%

Major acute symptoms during a heart attack in order of reported frequency include:

- Shortness of breath - 58%
- Weakness - 55%
- Unusual fatigue - 43%
- Cold sweat - 39%
- Dizziness - 39%

It's still not clear at what point these symptoms might help predict a heart attack, but women and their clinicians need to be sensitive to the wide range of symptoms that might signal a woman is having a heart attack. It's important not to miss the earliest possible opportunity to prevent or treat an AMI, the number one cause of death in both men and women. If you are a woman and have severe, unexplained fatigue or any of these symptoms at least several times a week, particularly if you have known risk factors for heart disease (like smoking or high blood pressure—see the links

Continued on page 11

Continued from previous page

below for more information), contact a health provider immediately. ♦

Source: *Circulation* 108,21:2619-2623

For more information about heart attacks, visit http://123819272.net/Diseases/HeartAttack/HeartAttack_WhatIs.html.

For more information on women and heart disease, visit *The Heart Truth*, a national awareness campaign for women about heart disease, at <http://www.nhlbi.nih.gov/health/hearttruth/> or contact:

NHLBI Health Information Center

Attention: The Heart Truth

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New Drug to Suppress Immune System

Immunosuppressant drugs are designed to inhibit the body's immune system so that your body doesn't reject transplanted organs, and to treat autoimmune diseases such as lupus, rheumatoid arthritis, eczema and psoriasis—conditions in which the body's own immune system attacks healthy, normal tissue as if it were an invading microbe. Unfortunately, current immunosuppressants can cause serious side effects such as diabetes, elevated cholesterol and high blood pressure. A new drug, developed by Pfizer Global Research and Development with help from NIH's National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), has now been successfully tested in mice and monkeys, and may eventually prove to be a major help for those needing organ transplants or with autoimmune diseases.

The new drug is designed to inhibit an enzyme called JAK3, a protein discovered by the NIAMS team in 1994 that is found only in immune system cells. Current immunosuppressants target enzymes found in cells throughout the body, resulting in toxic side effects. In setting out to find a compound that selectively inhibited JAK3 so that it only affected immune cells, Pfizer researchers searched through a library of chemical compounds developed by the company. They eventually arrived at a compound they call CP-690,550.

They tested CP-690,550 in mice with heart transplants and in monkeys with kidney transplants. In both cases, the animals treated with CP-690,550 survived much longer than untreated animals. Their survival

was also longer than that of animals treated with other immunosuppressant drugs in past studies, with fewer side effects.

This finding culminates a long process of research and discovery by the NIAMS team. After discovering JAK3, the team demonstrated that this protein, called a kinase, was critical for the cell signaling process, resulting in the development of infection-fighting white blood cells. They went on to show that the mutation of the gene encoding JAK3 was responsible for a form of severe combined immunodeficiency (SCID). Because JAK3 is essential for immune cell function, and because its expression is limited to blood cells, the team proposed that inhibiting JAK3 might be the basis for a new class of immunosuppressant drugs. The group then entered into a collaborative research and development agreement with Pfizer—a partnership that has facilitated Pfizer's development of this new drug.

This study shows that inhibiting JAK3 has the effect of suppressing the immune system, while not affecting other systems of the body. Further animal studies are now being done to determine if this drug could be tested safely in humans. If it proves safe and effective, it would prove a major advance in the development of immunosuppressant drugs. ♦

Source: *Science* 302:875-878

For more information about autoimmune diseases, visit http://health.nih.gov/result.asp?disease_id=63.

Continued from back cover

Treatments for Urinary Incontinence in Women. National Institute of Diabetes and Digestive and Kidney Diseases, NIH Publication 03-5104, June 2003. View online at: <http://kidney.niddk.nih.gov/kudiseases/pubs/treatmentsuiwomen/index.htm> or call 1-800-891-5390. E-mail: nkudic@info.niddk.nih.gov.

Understanding Risk: What Do Those Headlines Really Mean? National Institute on Aging, NIH Publication 03-5357, Summer 2003. View online at: <http://www.niapublications.org/engagepages/risk.asp> or call 1-800-222-2225.

Your Guide to Lowering Blood Pressure. National Heart, Lung, and Blood Institute, NIH Publication 03-5232, May 2003. View online at: <http://www.nhlbi.nih.gov/hbp/index.html> or call 1-301-592-8573. E-mail: nhlbipriority@prospectassoc.com.

New and Notable

The following new or revised NIH publications are available free to the public:

Do I Have Premature Ovarian Failure? National Institute of Child Health and Human Development, NIH Publication 03-5159, August 2003. View online at: <http://www.nichd.nih.gov/publications/pubs/pof/index.htm> or call 1-800-370-2943. E-mail: NICHDInformationResourceCenter@mail.nih.gov.

Families and Fragile X Syndrome. National Institute of Child Health and Human Development, NIH Publication 03-3402, July 2003. View online at <http://www.nichd.nih.gov/publications/pubs/fragileX/index.htm> or call 1-800-370-2943. E-mail: NICHDInformationResourceCenter@mail.nih.gov.

From the Blueprint to You—A Brief Guide to Genetics. National Human Genome Research Institute, NIH Publication 03-5377, April 2003. Call (301) 402-0911.

Home Safety for People with Alzheimer's Disease. National Institute on Aging, NIH Publication 02-5179, September 2002. View online at <http://www.alzheimers.org/pubs/homesafety.htm> or call 1-800-438-4380.

Kidney Stones in Adults. National Institute of Diabetes and Digestive and Kidney Diseases, NIH Publication 03-

2495, July 2003. View online at: <http://kidney.niddk.nih.gov/kudiseases/pubs/stonesadults/> or call 1-800-891-5390. E-mail: nkudic@info.niddk.nih.gov.

Low Back Pain. National Institute of Neurological Disorders and Stroke, NIH Publication 03-5161, August 2003. View online at: http://www.ninds.nih.gov/health_and_medical/pubs/back_pain.htm or call 1-800-352-9424. E-mail: ninds@iqsolutions.com.

Making a Difference in the Management of Asthma: A Guide for Respiratory Therapists. National Heart, Lung, and Blood Institute, NIH Publication 02-1954, May 2003. Call (301) 592-8573. E-mail: nhlbipriority@prospectassoc.com.

Medicines by Design. National Institute of General Medical Sciences, NIH Publication 03-474, June 2003. View online at <http://www.nigms.nih.gov/medbydesign/> or call (301) 496-7301.

Men Eat 9 a Day (fruits and vegetables). National Cancer Institute, NIH Publication 03-5332, April 2003. View online at: www.9aday.cancer.gov or call 1-800-422-6237.

The Heart Truth for Women—The Heart Truth for Latinas: An Action Plan. National Heart, Lung, and Blood Institute, NIH Publication 03-5065, September 2003. View online at: http://www.nhlbi.nih.gov/health/hearttruth/material/factsheet_latina.pdf or call 301-592-8573. E-mail: nhlbipriority@prospectassoc.com.

Continued on page 11

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