

## The coffee controversy

by Glen Hyland, M.D.

**H**umans have been ingesting caffeinated plants since the Stone Age. Steeping plants containing caffeine increased the stimulatory effects. Coffee use is recorded as early as the 9<sup>th</sup> Century in Ethiopia. Merchant trade of coffee from the Middle East is recorded from the 1450's. Coffee houses began in England in the 1650's, though it was referred to as Arabian wine during that period. As for today's traditional "Cup of Joe," estimates state that as high as 90% of American adults consume coffee (1-2 cups/day), while 40% will consume 4 or more cups/day.

Of the 200 plus chemicals found in coffee, caffeine (1,3,7 trimethylxanthine) is the primary reason for its consumption. Caffeine is both a central nervous system (CNS) and metabolic stimulant, affecting neurotransmitter function (adenosine, dopamine, serotonin, adrenergic, muscarinic, and nicotinic receptors) and endocrine function (ACTH, cortisol, insulin, gastric acid, epinephrine, and free fatty acid levels).

### Neurologic effects of coffee are related to caffeine and antioxidants:

Caffeine:

- increases heart rate, blood pressure, and blood flow to muscles, but decreases blood flow to skin and cerebrum
- increases blood sugar and FFA levels for aerobic and anaerobic energy production
- increases respiration, dilates pupils
- improves alertness, wakefulness, and flexibility in acceptance of other's opinions
- increases likelihood of tremors, anxiety, nervousness, and irritability
- increases ACTH production from pituitary

itary which increases cortisol levels and prepares for fight or flight response

- increases epinephrine release from adrenal gland
- increases intraocular pressure (1-2 points only); induces tinnitus (ringing in the ears)
- increases risk of sleep disturbance, adding to morning fatigue and drowsiness
- possibly improves short-term memory of simple tasks, but not of complicated tasks

The Crash: cognitive clouding, fatigue, sleepiness, +/- anxiety commonly occurs 4-6 hours after ingestion of coffee, lasting 1-2 hours.

Due to the dopamine receptor effect of caffeine, incidence of Parkinsonism is lower in patients with moderate coffee intake.

There is a lower recorded incidence of dementia in patients with moderate coffee ingestion; it is believed this is due to an antioxidant effect of coffee.

If caffeine ingestion continues chronically, specifically in high amounts (>6 cups/day), adrenal fatigue may result in 1 to 2 decades and/or Insulin Resistance may develop (Syndrome X, Metabolic Syndrome).

**Cardiovascular effects of caffeine are controversial:** Blood pressure measured either peripherally or centrally (within ascending aorta) temporarily rises with the consumption of caffeine. Peripheral BP measurements usually correct to normal without sustained BP elevation/hypertension (HTN). Highly sensitive patients may develop HTN with sustained caffeine ingestion. Total  
*continued on page 2*

## Nuts, popcorn, and diverticulitis

One-third of Americans develop diverticulosis (intestinal outpouches) by age 60, usually related to constipation. In about 25% of those with diverticulosis, these pouches become inflamed (called diverticulitis) and may bleed. Treatments range from fiber for relieving constipation to antibiotics and surgery. Also, doctors commonly recommend avoiding supposedly irritating foods, especially nuts, seeds, corn, and popcorn, but with scant evidence.

Now an 18-year prospective study in 47,000 male health professionals has found that those frequently consuming nuts or popcorn (at least twice per week) had a *lower* risk for diverticulitis (apparently unrelated to fiber). The study found no association between corn consumption and diverticulitis, or between nut, popcorn, or corn consumption and diverticular bleeding or uncomplicated diverticulosis. So, more of us may be able to enjoy the benefits of nuts, corn, and popcorn.

—*J Am Med Assoc* 2008; 300:907



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### Editors:

Marilyn Landreth & Barbara Dodson

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# Nutritional Medicine

by Rebecca K. Kirby, M.D., M.S., R.D.

## Grown-ups: step up to the plate

As adults we take responsibility for our behavior (or we should). For the next generation, that will be our legacy. What kind of example have we provided them? I am not talking about our environmental footprint; I am talking about the obesity epidemic.


Being overweight is a serious health concern, not only for adults but also for children and adolescents. The Centers for Disease Control and Prevention report data from two NHANES surveys (1976–1980 and 2003–2004) showing that the prevalence of being overweight is increasing at a rate of 14% for children aged 2–5 years. In addition, the report shows the prevalence rate has increased from 6.5% to 18.8% for those aged 6–11 years and for those aged 12–19 years, from 5.0% to 17.4%.

Some of the barriers to healthy diet and exercise in schools are snack and soda vending machines and lack of mandatory physical education. Many schools are now making an effort to address these problems. These habits of exercise and healthy food choices are areas where adults/parents need to step up to the plate as good examples. After all, children are not doing the grocery shopping and meal planning; big people are (or should be) making the food choices. Adults can serve as examples of what to eat. If adults are

not eating their 5 servings of fruits and vegetables a day (and 90% are not), then it would be no surprise to find that children are not eating fruits and vegetables.

What I remember as a kid was that we were always hungry at meal times, too busy running around playing to have time for snacking. This was, of course, the Dark Ages before computers and children's T.V. programs, plus there were no sodas or chips in our house. At meals, we always had a green vegetable, a yellow or orange vegetable, and a fruit (my mother was a Kansas State home economics major and knew how to proportion a healthy meal). So, I was lucky to have a good start, and, trust me, I did not have a choice of eating anything other than what was served.

Don't we want to provide all our children with a good start? Set the ground rules and model the behavior. Just because the prevalence of obesity in adults has doubled in the last 20 years, does not mean we should invite our children to follow suit. It is easier to develop good habits than to break bad ones.

So, whatever our level of involvement with the younger generation, we have a responsibility to get the obstacles out of their path, teach them, lead by good example, and set them up for a future of healthy eating and activity habits. 

### Coffee controversy—Cont'd from page 1

caffeine withdrawal for 6 months is usually required to correct caffeine induced HTN. Arrhythmias (irregular rate or rhythm of heart beat) can be induced by caffeine in patients with unhealthy conduction systems but are unlikely in healthy heart patients. Toxic caffeine levels (150 mg/Kg) can produce fatal arrhythmias; this would take 50 to 200 cups of coffee.

ASVD (atherosclerosis/atherosclerotic vascular disease) suggests no increased risk of heart disease among coffee users according to most studies, including Harvard (1990). Newer information shows a link between caffeine and homocysteine production. If correct, there could be a link between

caffeine and ASVD, although the antioxidants in coffee could counteract the homocysteine effect.

**Urologic effects of coffee are primarily caffeine related:** The diuretic effect of caffeine is well known. With a continued stable level of coffee ingestion, the diuretic effect becomes balanced, and excess water loss is markedly diminished. Frequency and nocturia are commonly caused by caffeine. In patients having had prostate operations (TURP or RRP), incontinence is more common in coffee users. Minerals, including calcium, magnesium, zinc, selenium, sodium, and iron are filtered

*continued on page 3*

and reabsorbed by the renal tubules. Caffeine can limit the reabsorption of these minerals. Possible side effects of limited reabsorption include bone loss (osteoporosis), kidney stones, infection risk, infertility risk, hyponatremia (low sodium), hypotension, and iron deficiency/anemia. Appropriate supplementation of calcium and magnesium minimizes bone loss. Zinc and selenium supplementation can help prevent increased infection and infertility risks respectively. Iron supplementation is rarely needed unless a GI tract or GU tract blood loss is apparent.

### **GI tract effects of coffee are related to caffeine, antioxidants, and bean oils:**

Increased gastric acid secretion by parietal cells may cause heartburn, especially if a hiatal hernia is present. Senior citizens typically have a decrease in gastric acid secretion, which may be corrected by modest use of coffee. Both caffeinated and decaffeinated coffee decrease lower esophageal sphincter tone, thereby allowing reflux of gastric acid into the esophagus, producing esophagitis (inflammation of the esophagus). Patients with heartburn (dyspepsia), esophagitis, gastritis, or peptic ulcer disease should avoid coffee and other caffeinated beverages.

Bile flow is stimulated by caffeine, helping to prevent gallstones, promoting fat absorption (including fat soluble vitamins), and maintaining normal liver function (including liver detoxification).

Gastric emptying, bowel peristalsis, and rectal stool evacuation are all stimulated by both the caffeine and bean oils in coffee. Thus, excess coffee use may lead to diarrhea. Normal bowel elimination is important to help prevent colon cancer (CA). Antioxidants in coffee may help reduce colon CA risk.

### **Pancreatic function related to caffeine and antioxidant effects of coffee:**

Studies regarding coffee (caffeine) and pancreas function suggest that Insulin Resistance can be a side effect of chronic caffeine use. Very modest use or avoidance of coffee is traditionally recommended for diabetic and metabolic syndrome patients; this helps prevent

*continued on page 5*

## HEALTH HUNTERS AT HOME

### Making the switch to holistic pet care

by Cindy Feldkamp, D.V.M.

Holistic. It's also called "going green." What, exactly, is it and how do you change over? Holistic pet care means looking at the whole picture as you examine your individual pet's diet, exercise, environment, social interaction, and healthcare, while living more peaceably with your little corner of the world. Underlying causes of problems are explored, rather than just current symptoms. Jump in 100% or try an integrated approach.

Start with diet. Look for foods made with a few whole ingredients, rather than processed meal and a long list of additives, preservatives, and by-products. A huge number of choices are available today. Bil-Jac, Solid Gold, Blue, and Chicken Soup for The Pet Lover's Soul are a few notable brands. Some pets need a longer adjustment period than others, so be patient. Change foods gradually for highest digestive comfort for your pet. Learn as much as you can before trying raw food diets. Many pros and cons need to be considered, such as increased exposure to bacterial infections for pet and owner. Be careful if immuno-compromised people share the home.

I recently examined a Mastiff with serious insomnia of three months duration. She paced the hardwood floors all night, every night. The frantic owner was feeding what the breeder recommended—raw meat and ground bones only. I suspect the complete lack of carbohydrates kept her stomach growling most of the time. Dogs are omnivores. Do remember that commercial pet foods are not perfect but are extensively researched, quality checked, and have eliminated the malnutrition and rickets seen often before the 1950's.


Does your cat or dog have routine playtimes or exercise? Improved circulation and oxygenation, clearer mentation, decreased toxic residues, improved muscle tone, and less frequent injuries are benefits. Social interaction is good mental stimulation and prevention for aggression or serious behavior problems. Never discount the value of

touch and eye contact! Isolation can lead to serious problems in some pets.

What is your dog's environment? Most pets are indoors 90% of the time and in contact with the floor a great deal. An evaluation of household cleaners, air fresheners, etc. would be helpful. Carpets can be reservoirs for toxic gases and molds. Are you currently using lawn chemicals for that perfect yard look? Herbicides have been linked to canine cancers. Evaluate any other sources of pollution. Rural residents need to check water supplies annually for bacteria and nitrate levels. When elevated, symptoms such as frequent illnesses or behavior changes could be possible.

Holistic medical care stresses less antibiotics and steroids and more nutraceuticals. Most controversy over alternative care surrounds vaccination protocols, because of vaccine reactions and feline vaccine-induced sarcomas. For many years, rabies vaccines have been produced with a full three-year immunity to reduce the amounts of antigen and carriers injected into our best friends. A three-year distemper/parvo vaccine has been on the market for several years. New vaccines may soon bear 10-year labeling. However, each city and county has the authority to designate how frequently the rabies vaccines are required.

Pain, suffering, and reduced life span from vaccines have been documented, mostly in cats from leukemia vaccines. It is my personal opinion that, on the whole, more pets die from too little vaccine than too frequent. I do continue to recommend annual or tri-annual vaccines for all indoor only cats, due to the severity of these viral diseases and a cat owner's propensity to adopt just one more unvaccinated or ill waif in need of a home. Also, remember airborne viruses and FeLV infectious saliva are transmissible through open window screens in the summer months.

On a related note, I recently read that about 50,000 fatal human cases of rabies occur worldwide every year. That rather puts things in perspective. 



## INFORMATION WORTH KNOWING

by Marilyn Landreth, M.A.

Did you know that the liver is the gateway to the body? That was something that I learned while reading *The Liver and Bowel Book* written by Sandra Cabot, M.D. She said that, with all the chemicals that are added to our food and environment, the liver detoxification system can be overloaded. Over 700 chemicals have been identified in drinking water. Plants are sprayed with toxic chemicals, and potent hormones and antibiotics are injected in animals that we eat. The vitamins and minerals that we need to detoxify the liver can be destroyed. People have found various ways, such as fasting or cleansing the bowels with fiber mixtures, to cleanse the liver. While this may work in the short run, Dr. Cabot thinks that rapid release of toxins can cause unpleasant side effects. She has included, from chef Audrey Tea, over 100 new liver cleansing recipes that can be used to develop a daily eating pattern to maintain a healthy liver. The questions this month are taken from her book.

**1** We only have one liver and its proper functioning is necessary for life since the liver is needed to purify the \_\_\_\_\_.

- a. urine
- b. blood
- c. lungs
- d. lymph system

**2** Many of the toxic chemicals that enter the body are fat-soluble. This means that they can only be dissolved in fatty or \_\_\_\_\_ substances.

- a. acidic
- b. alkaline
- c. soapy
- d. oily

**3** The liver's job is to convert fat-soluble chemicals into water-soluble chemicals so that they can easily be excreted from the body.

- a. True
- b. False

**4** There are two major detoxification pathways to get the fat-soluble toxins to the water-soluble state. Each of these phases needs specific \_\_\_\_\_ to help with the process.

- a. nutrients
- b. protease
- c. oleuropein
- d. lipase

**5** Through the second phase, the liver is able to turn drugs, hormones, and various toxins into excretable substances by adding sulphur-containing \_\_\_\_\_ and other nutrients.

- a. enzymes
- b. liquid
- c. amino acids
- d. fiber

**6** If either of the phases becomes overloaded, there will be a build-up of toxins in the body. The toxins are stored in the brain and bones where they can cause brain dysfunction and hormonal imbalances.

- a. True
- b. False

**7** The liver is the major fat burner in the body and regulates the \_\_\_\_\_ by a complicated set of biochemical pathways.

- a. metabolism
- b. pancreas
- c. lymphocytes
- d. digestion

• FOR ANSWERS, SEE PAGE 7 •

## Test of the Month

by Dr. James A. Jackson,  
Director, Bio-Center Laboratory

### Vitamin B<sub>6</sub>

Another essential B vitamin is B<sub>6</sub>. It is water-soluble, which means you cannot store it in your body and it must be continually supplied in your diet. B<sub>6</sub> has many names and forms: pyridoxine, pyridoxal, pyridoxamine, and the most important coenzyme form, pyridoxal 5'-phosphate (PLP).

PLP serves as a coenzyme in 100 enzyme reactions. It is very important in the brain, where it helps in the conversion of amino acids into serotonin and other neurotransmitters such as dopamine, norepinephrine, and GABA. It is also necessary for myelin formation and the synthesis of heme and red blood cell formation. It is an important cofactor in fatty acid metabolism by helping convert linoleic acid to arachidonic acid.

Severe deficiency of B<sub>6</sub> in the U.S. is uncommon. Alcoholics are at the most risk for severe deficiencies. It may also be seen in those with uremia, hyperthyroidism, congestive heart failure, malabsorption syndrome, pyrrroluria, etc. Mild deficiencies are common. Symptoms of B<sub>6</sub> deficiency may include poor wound healing, depression, skin problems, anemia, fatigue, convulsive seizures, stunted growth, and erratic blood glucose levels. Low levels of B<sub>6</sub> (along with folate and B<sub>12</sub>) may cause a high homocysteine level. Oral contraceptives may increase the need for this vitamin. It may also be used to reduce the nausea of pregnancy.

The RDA for adults is 1.7 mg/day. For pregnancy it is 1.9 mg and nursing mothers 2.0 mg/day. However, in pharmacologic doses, it is given in gram amounts! Major food sources include soybeans, liver, bananas, chicken, steak, kidney, tuna, lima beans, pork, beef, veal, beans, avocados, walnuts, peanuts, potatoes, milk, cheese, and eggs.

This vitamin is probably one of the more frequently ordered tests by Center physicians because it has so many important functions in the body. H

"In a democracy dissent is an act of faith. Like medicine, the test of its value is not in its taste, but in its effect."

—J. William Albright

*Coffee controversy—Cont'd from page 3*  
 hypoglycemic episodes. However, one study suggests a high ingestion rate of coffee (6-10 cups/day) in senior citizens (65 or older) decreases incidence of diabetes and pancreatic cancer, an antioxidant effect.

**Reproductive effects of coffee related to estrogenic influence of caffeine and lack of renal tubular reabsorption of selenium:** Fibrocystic breast disease, PMS symptoms, decreased sperm motility, and premature deliveries in women with history of spontaneous abortion are due to estrogenic effects of caffeine or depletion of selenium.

**Coffee as a possible carcinogen (cancer inducing agent):** Older epidemiologic studies have suggested that coffee is carcinogenic. Correlation between coffee use and cancer includes Bladder, NHL (Non-Hodgkin's Lymphoma), Ovarian, Pancreatic, and Kidney. The carcinogenic agent or possible promoter chemicals are related to caffeine and similar metabolites of coffee. Caffeine appears to prevent tumor protein 53, providing the time for DNA mutation repair, thereby allowing mutated DNA to be carried forward. Consistent mutations resulting from caffeine ingestion that predictably cause specific cancers have not been shown in research. It is possible the potential carcinogenic effect of caffeine is counteracted by the antioxidants in coffee and other nutrients of a balanced diet.

Interestingly, Allen Conney of Rutgers State University of N.J. has found that the presence of caffeine in skin lotions may have a protective effect against the development of BCC (Basal Cell CA) and SCC (Squamous Cell CA) of the skin. Caffeine appears to block ultraviolet light, thereby decreasing induction of skin cancers.

Individual responses to the chemicals found in coffee are highly varied, due in majority to differences in age, detoxification by liver, use of BCP, HRT, pregnancy status, and neurotransmitter sensitivity. The amount ingested and rate of ingestion may also account for response differences. Despite the controversies of coffee ingestion side effects, 2 cups/day is safe for the vast majority of asymptomatic coffee users. [H]

# Herbal History

by Chad A. Krier, N.D., D.C.

## Progesterone promoting herbals

Phytoprogest by Wise Women Herbals is a plant based medicine that supports the female hormonal system. Namely, it is supportive to the hormone progesterone. This herbal combination is best used in cases when progesterone is low or estrogen is dominant. It can be useful for a variety of symptoms and conditions including uterine fibroids, fibrocystic breasts, endometriosis, menstrual cramps, PMS, and irregular female cycles due to corpus luteum insufficiency. The herbs used in this formula are also supportive of the detoxification of hormones by the liver.

Phytoprogest contains dry fruit of Vitex (Chaste tree), dry root & rhizome of Dioscora (Wild yam), dry root of

Smilax (Sarsaparilla), fresh whole plant of Taraxacum (Dandelion), and dry seed of Trigonella (Fenugreek). Vitex shifts the ratio of estrogen and progesterone in favor of progesterone by stimulating the luteal phase of menses. Wild yam relaxes muscle spasms and is supportive to the liver. Sarsaparilla supports the luteal phase of the menstrual cycle. Dandelion helps to normalize estrogen by supporting the conjugation of hormones in the liver. Fenugreek is considered a hormone balancer for its endocrine stabilizing properties.

The recommended dosing for phytoprogest is to take ½ tsp of the liquid tincture mixed in water or by itself three times daily. [H]

# Food of the Month

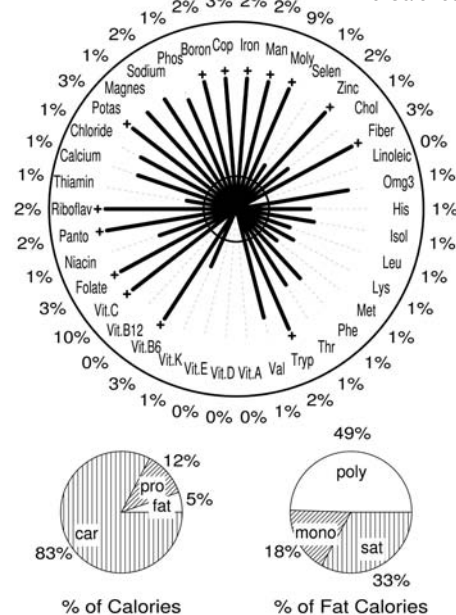
by Donald R. Davis, Ph.D.



**RADISHES** vary greatly in size, color, pungency, and growing time. Spring or summer radishes mature quickly. They are usually red and round, but can be white and carrot-shaped, or other colors and shapes. Winter radishes such as Daikon include many large varieties widely eaten in East Asia. They are usually white and elongated. Although radishes are extremely rich in nutrients per calorie, Americans rarely eat enough to supply substantial nutrients. A half-cup of sliced, red radish contains only 9 Calories and 1% to 3% of the RDAs of most nutrients. However, radishes also supply good amounts of beneficial phytochemicals.

## NutriCircle

1/2 cup = 9 Calories

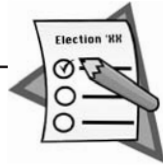


The length of each bar shows the amount of one nutrient. If a bar extends out to the inner circle, the food has enough of that nutrient to match the calories it contains. The numbers show nutrient amounts in RDAs per serving shown. The pie charts show the sources of calories (left) and the types of fat (right). [H]

# Mental Medicine

by Marilyn Landreth, M.A.

## Are you a member of the team?




The weather is cooling down and the leaves are beginning to turn from green to yellow, brown, and red. If the weather is cooling, the rhetoric is not. This is an election year and for a change people are discussing the candidates for president. Sometimes the discussions take on a life of their own.

Have you noticed how our experiences and beliefs influence our perceptions? Have you experienced how the voices of the "other" party or parties can get on your nerves? Do you sometimes refute what they are saying without even listening to what they are saying? It is an interesting phenomenon.

John Renisch said, "Democracy is a team sport. It is not like going to

a ballgame where you sit passively and decide if you like the players and evaluate their abilities after watching the game. We are the players, we are the team in a democratic nation or a democratic world."

We understand that many people have fought and died for us to have the right to vote. Sir Winston Churchill said, "At the bottom of all the tributes paid to democracy is the little man walking into the little booth with a little pencil, making a little cross on a little bit of paper. No amount of rhetoric or voluminous discussion can possibly diminish the overwhelming importance of that act." Take a few minutes this year to make your views heard. Each vote is important. 


## Case of the month

An 86-year-old man first came to The Center in March 2008. He had a history of celiac disease and complained that his legs had been covered with a rash for four months and that the rash had an intense fire-like itch. He was also found to have a non-healing leg ulcer. He wanted to find out what had caused his rash. His goal was to have his legs heal so he could travel with his wife as they had planned.

He saw Dr. Chad Krier for his initial appointment. Dr. Krier suggested the following lab work: CoQ10; creatine; CRP; DHEA; G6PD; histamine; vitamins A, C, E, B12, and folate; zinc and mg/ca ratio on the RBC; candida antibodies; EFA; and the standard list of the Cytotoxic Food Sensitivity test with an additional two foods tested individually. Dr. Krier also suggested that he have an indican level done on urine.

Treatment suggestions included IV vitamin C infusions with added zinc. A serum vitamin C level was to be drawn after the 50-gram vitamin C infusion. It was suggested that he have the infusions three times a week for two weeks. Also suggested was a daily injection of vitamin B1, vitamin B6, and vitamin B12 for five days. Hyperbaric oxygen therapy was suggested five days a week for two weeks. The man stated that he had tried several other things and nothing had worked. He agreed to try all of the treatments suggested by Dr. Krier.

During the first two weeks he also saw Dr. Rebecca Kirby and Dr. Glen Hyland. He received advice from Dr. Kirby regarding his diet and what foods to avoid. She suggested he continue to avoid all gluten foods, to avoid the foods he was sensitive to, and to start taking a probiotic. Dr. Hyland suggested that he should have a skin biopsy to rule out cancer. The man did all that was suggested.

After three weeks, the man's rash had greatly improved and the itching had decreased. His leg ulcer was healing and was less tender. The skin biopsy was negative for cancer. The man is very happy with his results and plans to start traveling soon. 

## CENTER UPDATE

by Dr. Joseph Casciari

## New strategies for restoring health


What regulates the behavior of fat cells, lung cells, or cancer cells? How do cells "decide" to "become" muscle or white blood cells? The answers to these questions may provide clues toward reversing cancer, chronic illnesses, and even aging. The Bio-Communications Research Institute (BCRI) is mining for clues in the fields of stem cell and angiogenesis (new blood vessel growth) research.

To understand stem cells, consider that all human cells contain the same set of instructions, the same DNA, but that each cell only executes a small portion of those instructions. Through a process called "differentiation," cells are committed to their role or type (lymphocyte, nerve cell, etc.). Stem cells are undifferentiated cells that potentially can be "matured" to a variety of cell/tissue types. This presents exciting prospects for replacing damaged or degenerative tissues. However, finding reliable stem cell sources for research has been difficult.

BCRI researchers, led by Dr. Xiaolong Meng, recently developed a

way to harvest stem cells from adult menstrual blood. The protocol was published in the *Journal of Translational Medicine* (2007), earning BioMed Central's "Research Article of the Year" award. The team is now looking into using menstrual-blood-derived stem cells to treat cancer. These cells release chemical signals that may "down-regulate" cancer cells or stimulate the immune system. It may also be possible to differentiate these stem cells into a cancer killer cell type.

Meanwhile, the BCRI is examining another key factor in tumor growth and wound healing: new blood vessel formation (angiogenesis). Dr. Nina Mikirova has developed new protocols for monitoring blood vessel cells. Her data indicate that high concentrations of vitamin C inhibit angiogenesis, a potential mechanism for its action against tumors.

These efforts are examples of BCRI's overall approach: to find ways to restore health by restoring metabolic balance and using the body's own healing power. 

Answers from page 4

- 1 b. Under a microscope you can see rows of liver cells separated by spaces, which act like a filter or sieve.
- 2 d. They cannot be dissolved in water and tend to be stored in fat tissues and cell membranes.
- 3 a. They are excreted from the body via watery fluids such as bile and urine.
- 4 a. During phase one, free radicals are produced which, if excessive, can cause liver damage. Antioxidants, such as vitamins C and E, can reduce the damage.
- 5 c. Amino acids, such as taurine and cysteine, and nutrients, such as glycine, glutamine, choline, and inositol, are also required for efficient detoxification.
- 6 b. Since the toxins are fat-soluble, they will not be stored in the bones. They can accumulate in the brain and endocrine (hormonal) glands.
- 7 a. The liver can also pump excess fat out of the body through the bile into the small intestine. H

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 by Sandra Cabot, M.D.

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# Upcoming Events. . .

## Lunch & Lectures:

### October:

- 2 What are Antioxidants and Why Should I Measure Them?
- 9 Obesity: What Are the Risks & Strategies?
- 16 What Children Really Need
- 23 Fending Off Colds the Natural Way

### November:

- 6 Health Hunter/Beat The Odds "Ask the Doctors"
- 13 Aluminum, Cadmium, Lead, and Mercury Should Be in Cans, Batteries, and Thermometers: What Are They Doing in Our Bodies?
- 20 The Coffee Controversy

**October 2** - Health Hunter/Beat The Odds "Ask the Doctors"  
FREE Evening Lecture

**October 3 & 4** - Health Hunter/Beat The Odds Days

## How much fish to eat during pregnancy?

Infants develop faster and have better IQs and success later in life if they get enough DHA, an omega-3 fat needed for brain growth. Mothers eating enough DHA from fish and other sources pass good amounts to their children during pregnancy and breastfeeding. However, mercury worries led the FDA to advise pregnant women to limit fish intake to 12 oz. per week.

A recent study of 25,000 infants adds to evidence that this limit is too low. At this maternal intake, benefits in 18-month-old toddlers were still increasing strongly (such as talking, climbing stairs, and drinking from a cup), with no sign of harm. DHA-rich fish with little mercury include salmon, herring, sardines, mackerel, and trout. Other sources are high-omega-3 eggs, fish oil supplements, catfish, and chicken wings and legs. Avoid deep fried foods, as they may interfere with DHA.

—*Am J Clin Nutr* 2008; 88:789