



# Harvard Women's Health Watch

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## Botox: Beyond cosmetic fixes

*The procedure that revolutionized wrinkle treatment has myriad medical uses, many still experimental. What's the evidence?*

At one time, most of us knew about botulinum toxin mainly as the source of deadly botulism food poisoning. Produced by the bacterium *Clostridium botulinum*, the toxin is one of the most lethal substances on earth. Ingested, it can paralyze muscles throughout the body, including those that control breathing. Yet on a smaller scale, the same mechanism can do a body good. Injected into muscle tissue, for example, botulinum toxin can ease debilitating spasms and pain.

### The many faces of Botox

Today, most of us are familiar with botulinum toxin as Botox, the popular cosmetic treatment approved in 2002 to minimize the appearance of glabellar lines—vertical furrows between the eyebrows that become more pronounced as we age. By preventing muscle contractions that cause facial lines, Botox smooths the skin and makes it look younger. It's now widely used to treat a range of facial wrinkles, including those that appear on the neck (turkey neck), at the corners of the eyes (crow's feet), and across the forehead.

Botox gets the headlines these days as a wrinkle reducer, but it has a longer history as a medical therapy. Fifty years ago, researchers showed that injecting tiny amounts of botulinum toxin relaxed overactive muscles by blocking the release of acetylcholine, a neurochemical essential for muscle contraction. In 1989, Botox was approved for the treatment of strabismus (misaligned eyes) and blepharospasm (abnormal squinting and eyelid twitching). Since then, it's been approved for the treatment of cervical dystonia (muscle spasm affecting the neck and shoulders) and hyperhidrosis (severe sweat-

ing). Myobloc, which is made from botulinum toxin strain type B (Botox is made from the type A strain), is also approved for the treatment of cervical dystonia. Dysport (another form of botulinum toxin type A) came on the market this year and is approved for both cervical dystonia and glabellar lines.

Botox and its cousins have the official go-ahead for just a few medical indications, but once a drug is approved, it can be prescribed at a clinician's discretion. So the toxin is now being used for a growing list of conditions. (See "Some conditions treated with botulinum toxin," page 3.) Many of these uses make sense given the toxin's effect on muscle action, but some experts are

concerned about the lack of studies proving safety and effectiveness. Before considering a botulinum toxin injection, you should learn about the proven (and often less invasive and less expensive) alternatives. A qualified physician is unlikely to suggest botulinum toxin unless the alternatives have failed, or studies have shown it's the best (or only) option. Keep in mind that unapproved treatments may not be covered by insurance.

Whether botulinum toxin is used for cosmetic or medical purposes, its effects are temporary, so repeated injections are part of the therapy. The dose depends, among other things, on your weight, the condition being treated, the preparation used, and the amount of muscle into which it's injected. With repeat injections, muscles may atrophy and lose some function, an effect that's reversed when the injections stop. Some patients receiving botulinum toxin in large doses for medical conditions have become resistant to the drug, that is, they've developed antibodies that hamper its activity. ▶▶



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## Botox continued

Resistance may be minimized by giving the smallest effective dose and spacing injections further apart.

Below is some information on the medical applications of botulinum toxin and the state of the evidence for them.

### A good choice for focal dystonias

Dystonia is a neurological disorder characterized by chronic, involuntary muscle contractions resulting in uncontrollable movements or postures. Focal dystonia is any dystonia limited to a specific group of muscles, for example, cervical dystonia, which involves the muscles of the neck and shoulders, or spasmodic dysphonia, which involves the vocal cords. (See "Focal dystonias treated by botulinum toxin," below.)

Toxin injections have shown beneficial effects on many focal dystonias that do not respond to physical therapy, medications, and surgery. Possible side effects include muscle weakness, flulike symptoms, and dry mouth.

### Easing anal fissure

An anal fissure is a tear in the lining of the anal canal, usually caused by a strained bowel movement or the passage of a hard stool. It causes bleeding and severe pain, and it can trigger a spasm in the underlying sphincter muscle that prevents the fissure from healing. Surgery is the standard treatment, but it causes incontinence in up to 30% of patients. Nitroglycerin and calcium-

channel blockers may help, but they cause headache in many patients.

Botulinum toxin injection has been used to treat anal fissures for more than 15 years, and numerous studies have confirmed its effectiveness. According to a report in *Surgical Clinics of North America* (August 2006), as many as 80% of sufferers experience pain relief and healing, although sometimes more than one injection is needed.

Botulinum toxin is more effective overall than topical nitroglycerin, but patients who don't respond to one of these treatments often respond to the other. Because the injections are invasive, it's probably best to try nitroglycerin first. If you need the toxin, insurance usually covers the cost.

### Myofascial pelvic pain syndrome

Myofascial pelvic pain syndrome (MPPS) is a chronic pain disorder involving muscle contractions and spasms in pelvic floor muscles with unusually tender areas, called trigger points. Symptoms include aching, heaviness, or burning in the vagina, vulva, rectum, or bladder, sometimes extending to the thighs, lower abdomen, or buttocks. Overactive bladder, constipation, and painful intercourse are often part of the picture. The underlying cause is unknown but probably involves a combination of factors. Treatments include painkillers, antidepressants (at doses that reduce pain), psychotherapy, meditation, physical therapy to

## Focal dystonias treated by botulinum toxin

Name/Symptoms	Comments
<b>Cervical dystonia (CD)</b> Abnormal, painful positions of the head, neck, and shoulders.	FDA-approved. A 2008 <i>Neurology</i> review of randomized controlled trials confirmed that both toxin type A and type B are safe and effective. There are few effective alternatives for CD.
<b>Blepharospasm</b> Involuntary blinking or squinting	FDA-approved. In 2009, the <i>Cochrane Database of Systematic Reviews</i> concluded that 90% of patients benefit. There are no effective alternatives.
<b>Writer's cramp, musician's cramp</b> Limited finger movement, impairing ability to write or play a musical instrument. In golfers, it can cause trouble putting, called "the yips."	Several small trials have found that toxin injections can alleviate hand cramping; to avoid side effects, find a clinician with experience and skill injecting the toxin. Other medications have shown few benefits; surgery is not effective.
<b>Spasmodic dysphonia (SD)</b> Spasm of the vocal cords. Disrupts speech and affects voice quality, producing a "strangled-sounding" or (less commonly) breathy voice.	The toxin seems to be more effective for SD characterized by a strangled-sounding voice. There are no effective alternative therapies for SD.

stretch and strengthen pelvic floor tissues, and anesthetic injections into trigger points.

Botulinum toxin injections are an option for women who get no relief from physical therapy or anesthetic injections. The evidence so far is sparse but promising. A pilot study involving 12 women given Botox injections in the pelvic floor found some pain reduction. In a randomized controlled trial involving 60 women with chronic pelvic pain, Botox was more effective than a placebo in reducing pelvic-floor muscle pressure and some types of pain.

### Botox for headache? Probably not

Researchers began to study Botox as a treatment for headaches after migraine patients getting cosmetic injections reported having fewer headaches. Scientists speculated that the toxin suppresses not only muscle contractions but also pain signals. But now, data suggest that the toxin isn't much better than a placebo in treating most headaches.

Based on a review of 11 randomized controlled trials, researchers reported in the journal *Neurology* (May 6, 2008) that the toxin was “probably ineffective” in treating episodic migraine and chronic tension headache. As a result, the American Academy of Neurology (AAN) advises against the use of botulinum toxin for these purposes. That's not to say it might not work for certain individuals, or at doses larger than those used in the controlled trials. But given the lack of proof, the possible side effects (drooping eyelid and temporary weakness of neck muscles), and the expense (\$250 to more than \$1,000 per treatment, depending on the amount of toxin used), it's probably best to avoid botulinum toxin as a headache remedy, unless you and a physician familiar with your situation determine that it's worth a try.

### Other uses

There's reasonably good evidence that botulinum toxin is safe and helpful for several other medical conditions, such as hemifacial spasm (chronic facial muscle contraction), achalasia (a rare esophageal disorder that makes it difficult to swallow food), axillary hyperhidrosis (excessive sweating from the armpits), palmar hyperhidrosis (excessive sweating of the palms), essential hand tremor, and spasticity from conditions such as stroke and multiple sclerosis.

Toxin injections are no cure-all. As noted above, recent reports have underscored their limits as a headache treatment. And although the FDA has approved botulinum toxin for the treatment of strabismus (misaligned eyes), there is a shortage of high-quality (randomized) evidence for this approach, as well as a complication rate ranging from 24% to 55%, according to a 2009 report in the *Cochrane Database of Systematic Reviews*.

### Black-box warning and other safety issues

In April of this year, the FDA ordered a “black box” label for all Botox and similar products—the strongest drug-

## Some conditions treated with botulinum toxin

### Approved uses

- Strabismus (misaligned eyes)
- Blepharospasm (eyelid twitching)
- Cervical dystonia (neck spasm and pain)
- Hyperhidrosis (excessive sweating)
- Severe jaw pain
- Temporomandibular joint syndrome
- Trigeminal neuralgia (intense facial pain)
- Dysphonia (difficulty producing sounds)
- Raynaud's phenomenon

### Unapproved, off-label uses

- Focal dystonias
- Cerebral palsy
- Tremor
- Hypertonia (abnormal increase in muscle tension and reduced ability of a muscle to stretch)
- Post-stroke spasticity
- Drooling
- Excessive salivation
- Rhinitis (runny nose)
- Tension headache
- Migraine headache
- Ringing in the ears (tinnitus)
- Facial tics
- Bruxism (teeth grinding)
- Achalasia (difficulty swallowing)
- Stuttering
- Tourette's syndrome tics
- Piriformis syndrome (sciatic nerve compression in the buttocks)
- Facial scars
- Anal fissure
- Constipation
- Pelvic pain
- Low back pain
- Incontinence
- Overactive bladder
- Hair loss
- Phantom limb pain
- Tennis elbow

packaging warning that the agency can require. The label now states that the toxin can potentially spread beyond its injection site to other parts of the body and cause symptoms of botulism, including muscle weakness and trouble breathing or swallowing. The FDA move was prompted by reports of serious health problems and a number of deaths arising from the unapproved use of the toxin in treating certain medical conditions, especially spastic limb movements in children with cerebral palsy. The agency emphasized that spread of the toxin to other body sites is not a danger when Botox is used at approved doses for cosmetic purposes. The FDA also warned that toxin potency can vary among products, so doses, which are expressed in “units,” aren't necessarily interchangeable from one product to another.

Finally, if you're considering botulinum toxin injections for any reason, cosmetic or medical, the standard caveats apply: look for a licensed, board-certified physician who has extensive experience with botulinum toxin and its potential side effects. Don't be afraid to ask questions. Request permission to speak to a patient the clinician has treated. And before treatment, be sure to tell your physician about any prescription or over-the-counter medications you're taking, as well as anything you're allergic to and any medical problems you might have. ♥

# Anaphylaxis: An overwhelming allergic reaction

*Swift action is needed to short-circuit potentially deadly symptoms.*

Sarah Lyman had no reason to worry when her husband John left the house for a jog after lunch: he looked his usual healthy self. Twenty minutes later, she got word that he had collapsed by the side of the road—fighting for breath. At the hospital, she learned that the cause was anaphylaxis (also called anaphylactic shock or allergic shock), likely brought on by the lobster salad they'd eaten for lunch. Fortunately, John was treated in time and survived. That he was allergic to shellfish was news to him.

Anaphylaxis is a severe and sometimes life-threatening reaction that can develop within an hour—and sometimes within minutes or even seconds—after exposure to an allergen, a substance to which an individual's immune system has become sensitized. Many allergens can touch off anaphylaxis, including foods, medications, and insect stings (see “Anaphylaxis triggers,” page 5). In John Lyman's case, his postprandial jog likely played a role: anaphylaxis is occasionally triggered by aerobic activity like jogging—especially after ingesting allergenic foods or medications. Sometimes, the cause is unknown.

Anaphylaxis occurs when allergen-sensitized cells in blood and other tissues release large amounts of histamine and other inflammation-causing chemicals. While most allergic reactions involve only one physiological system (the upper respiratory tract or the skin, for example), anaphylaxis is a cascading response involving multiple systems. (See “Signs and symptoms of anaphylaxis in affected body systems,” below.)

Symptoms are variable but can include flushing, itching, nasal congestion, wheezing, difficulty breathing, and swelling of the throat and tongue, sometimes accompanied by

nausea, vomiting, and diarrhea. Blood pressure may drop precipitously, causing faintness. An immediate injection of epinephrine (adrenaline) can stop the cascade, which otherwise may result in fainting, shock, and even death.

Anaphylaxis is probably more common than once thought. It's treated in many different places—hospitals, emergency rooms, and clinicians' offices, as well as non-medical settings—and health authorities don't keep track of cases, so there's no single source of data on it. Also, because the symptoms are so variable, anaphylaxis may be confused with something else, such as an asthma attack, a panic attack, even an intestinal infection or food poisoning. And people with mild symptoms may not seek medical help. A 2006 study by Harvard Medical School researchers found evidence that anaphylaxis is vastly underreported as the cause of serious allergic reactions treated in emergency rooms—a problem, because proper diagnosis is the first step in preventing another anaphylactic reaction.

Last year, a panel convened by the American College of Allergy, Asthma, and Immunology reviewed data from a number of sources and concluded that anaphylaxis affects 1% to 2% of the population, and the frequency is increasing (*Current Opinion in Allergy and Clinical Immunology*, August 2008). The study also found that risk is higher in women than in men. (According to the panel, laboratory findings suggest that the female hormone progesterone may boost the body's response to an allergen.) Fatal anaphylaxis is thought to be rare, but underreporting could be a problem here, too, because the reaction may be overlooked as the cause of death in people who have asthma, lung disease, or cardiovascular disease.

Anyone who's had anaphylaxis is at risk for further such reactions in the future, so it's important to identify and avoid the triggers and to prepare for any accidental exposure. That means having self-injectable epinephrine on hand at all times and knowing how to use it.

## Anatomy of allergy and anaphylaxis

Allergies typically develop for two reasons: first, genetic predisposition (your risk of developing allergies is 50% if one parent has allergies, 70% if both parents are allergy sufferers); and second, environmental factors, especially in early childhood. According to the “hygiene hypothesis,” the immune system in people who aren't exposed to a wide variety of germs early in life is more likely to incorrectly develop an allergic immune reaction to harmless foreign antigens.

Having an allergy means that your immune system reacts to an allergen as a threat and

### Signs and symptoms of anaphylaxis in affected body systems

System	Signs and symptoms
Mucocutaneous (skin and mucosal areas)	Warmth and flushing of the skin, hives, intense itching, swelling beneath the surface of the skin (angioedema), measles-like rash, hair standing on end (piloerection), itchy scalp. Itching or tingling of the lips, tongue, or roof of the mouth. Swelling of the lips, tongue, or uvula. Metallic taste. Itching, swelling, and redness around the eyes, tearing. Itching in the ear canals.
Respiratory	Runny nose, congestion, sneezing. Tightness in the throat (possibly accompanied by difficulty swallowing), impaired speech, hoarseness. Shortness of breath, labored breathing, chest tightness, deep cough, wheezing, obstructed airflow.
Gastrointestinal	Nausea, cramping, vomiting, diarrhea.
Cardiovascular	Chest pain, palpitations, abnormal heart rhythm, low blood pressure (possibly accompanied by tunnel vision and difficulty hearing), pallor, faintness or dizziness, loss of consciousness.
Other	Anxiety, feeling of impending doom, confusion. Lower back pain in women (due to uterine cramping).

mounts a defense against it each time it comes in contact with it. Your first contact with the allergen may produce no obvious symptoms, but it stimulates the production of large amounts of an antibody protein called immunoglobulin E, or IgE. In allergy-prone people, IgE is produced in response to generally harmless substances, such as a food or medication. IgE locks onto immune cells (mast cells in tissue and basophils in blood) to prepare for the next encounter with the allergen—a process known as sensitization. Now, whenever you're subsequently exposed to the allergen, IgE signals the mast cells and basophils to disgorge inflammation-causing chemicals called mediators. The symptoms depend on the mediator and the tissue in which it's released—for example, the mediator histamine can cause blood vessels to dilate and airways in the lungs to narrow.

An anaphylactic reaction usually comes on fast, and it involves at least two different body systems (the skin and the lungs, for example). Under certain circumstances, a drop in blood pressure alone may be a tip off that you're having an anaphylactic reaction. Your susceptibility to anaphylaxis is increased if you have a history of allergies, a previous episode of anaphylaxis, or asthma (even in a mild form) in addition to a food allergy. Asthma that isn't well controlled raises the risk of death from anaphylaxis, as does cardiovascular disease.

Certain cardiovascular medications (alpha-adrenergic blockers and beta blockers) can lower the effectiveness of epinephrine, the key treatment for anaphylaxis; so if you're taking one of those medications and have allergies, consult your clinician.

## What to do

If you have a history of anaphylaxis, you should carry injectable epinephrine with you at all times. It comes in an autoinjector device (EpiPen, Twinject), available by prescription. A recent study suggests that epinephrine isn't as widely prescribed as it should be; if you haven't received a prescription, speak to your clinician. Another problem is that people are not always instructed in how to use the device. When the need arises, you will be under great stress, so you must know what to do in advance. It's best to carry two devices, in case one malfunctions.



EpiPen (epinephrine)

Inject epinephrine at the first sign of intensifying allergic symptoms, especially lightheadedness, trouble breathing, or tightness in the throat. Other drugs used to treat allergies, such as antihistamines and asthma inhalers, can help with some symptoms (hives, for example) but not the most dangerous ones. Epinephrine is the *only* drug that affects all the physical changes that occur with anaphylaxis. It prevents or reverses airflow obstruction and protects against cardiovascular collapse (the sudden loss of blood flow due to cardiac or vascular factors), which are the chief causes of death from anaphylaxis.

## Anaphylaxis triggers

Trigger	Examples/sources
<b>Foods</b>	Peanuts, tree nuts (walnuts, pecans, almonds, cashews), shellfish (lobster, shrimp, crab, clams, mussels, oysters), fish, milk, eggs. Food additives, including spices and vegetable gums.
<b>Insect stings</b>	Insects from the order Hymenoptera, which includes Vespidae (hornets, yellow jackets, wasps), Apidae (bumbees, honeybees), and Formicidae (fire ants).
<b>Drugs</b>	Antibiotics (especially those in the penicillin and cephalosporin groups); nonsteroidal anti-inflammatory drugs such as ibuprofen, naproxen, and aspirin; some contrast agents (dyes) used in diagnostic x-rays and scans; chemotherapy agents* (platin drugs, taxanes, doxorubicin); opiates; monoclonal antibodies.
<b>Natural rubber latex**</b>	May be found in medical and dental supplies, including some disposable gloves, catheters, blood pressure cuffs, stethoscopes, goggles, and dental dams; and in many other products, including condoms, diaphragms, balloons, sports equipment, dishwashing gloves, rubber bands, erasers.+
<b>Other</b>	Injected anesthetic agents such as procaine or lidocaine; neuromuscular blocking agents used during anesthesia, such as vecuronium and suxamethonium; seminal fluid.

\* By the seventh round of chemotherapy, as many as one-fourth of cancer patients develop allergic reactions, including anaphylaxis.

\*\* People with latex allergy are often also allergic to certain foods, such as bananas, avocados, kiwis, and chestnuts.

+ Sources of latex-free consumer and medical products are listed on the Web site of the American Latex Allergy Association, [www.latexallergyresources.org/links/products.cfm](http://www.latexallergyresources.org/links/products.cfm).

Here's how to use an epinephrine autoinjector device:

- If possible, lie down before using your epinephrine injector (but don't delay if lying down isn't an option). Grasp the device firmly around its center with your writing hand, making a fist.
- With the other hand, remove the safety cap. (Leaving the cap on is a common mistake.)
- Rest the needle end of the device on your outer thigh, and push it in hard until it clicks. (The needle is designed to go through clothes, so don't waste time adjusting them.)
- Leave the device in place for a count of 10; remove it and check to see that the container has emptied. Massage the injected area for 10 seconds.
- Call 911, or ask someone to make the call. Put the injector back into its case, needle end first, and take it to the hospital for disposal.
- Be prepared to use your second EpiPen (or second Twinject dose) if you don't get relief within 20 minutes, or if there's a delay in getting to an emergency room and symptoms recur.

- If you're feeling weak or dizzy, lie down with your legs elevated. Do not try to sit up; it may prevent blood from reaching the heart and brain.

Even if the injection relieves your symptoms, you should get to the emergency room as soon as possible. Up to 20% of people with anaphylaxis have a biphasic pattern—that is, symptoms return (usually within eight hours) after the original reaction has seemingly ended. Depending on the severity of your reaction, you may need treatment with oxygen, a breathing tube, intravenous fluids, and various medications.

If you're susceptible to anaphylaxis, it's important to take preventive measures. See an allergist for a full evaluation. She or he can perform tests to help identify the allergen that triggered your reaction and advise you on how to avoid problems in the future. Make sure your epinephrine prescription is up to date and keep it with you at all times. Don't let it freeze nor repeatedly expose it to extreme heat.

If you've had an anaphylactic reaction or any systemic

### Selected resources

American Academy of Allergy, Asthma, and Immunology  
[www.aaaai.org/patients/gallery/anaphylaxis.asp](http://www.aaaai.org/patients/gallery/anaphylaxis.asp)  
 414-272-6071

Food Allergy and Anaphylaxis Network  
[www.foodallergy.org](http://www.foodallergy.org)  
 800-929-4040 (toll-free)

response to an insect sting, the main preventive treatment is immunotherapy—allergy shots, which are 97% effective at preventing a severe or life-threatening reaction from future stings. Researchers are working on immunotherapies for some food allergies, but their work is still considered experimental.

If you've ever had an anaphylactic reaction, wear a medical identification bracelet or necklace with a list of known allergies as well as the names and phone numbers of emergency contacts. (You can buy a medical bracelet through the nonprofit MedicAlert Foundation, 888-633-4298, [www.medicalert.org](http://www.medicalert.org).) Make sure family and close friends know about your allergies and when and how to administer your epinephrine in case you can't do it yourself. ♥

## IN THE JOURNALS

### Link found between migraines with aura and late-life brain lesions in women

Migraine is a chronic headache disorder characterized by intense pain (typically beginning on one side), sensitivity to light (photophobia) or sound (phonosensitivity), and often nausea and vomiting. Women are three to four times more likely to be affected than men. In some people with migraine, headache pain is preceded by neurological symptoms called an aura, which consists mostly of visual disturbances such as sparkles, jagged lines, blind spots, and halos. Some people suffer from difficulty speaking or numbness in the face or extremities.

A new study has found that women who experience migraine with aura are at an increased risk later in life for tissue damage in the cerebellum, a region in the lower back of the brain that helps regulate movement, balance, and coordination. Clinicians describe the areas of tissue damage as infarct-like lesions. (An infarct is the death of tissue from loss of blood supply.) So far, their significance is unknown.

The study, led by scientists at the National Institute on Aging (part of the U.S. National Institutes of Health), is based on information gathered during a study of cardiovascular disease by the Icelandic Heart Association. The subjects, 4,689 women and men living in Reykjavik, were first interviewed about headaches between 1972 and 1986, when their average age was 51 years (age range 33 to 65). Those reporting more than one or two headaches per month were asked about migraine symptoms, including nausea and vomiting, photophobia, and numbness or visual disturbances preceding the headache.

A quarter-century later, participants were interviewed again, underwent MRI scans of the brain, and were assessed for cardiovascular risk factors. Headache sufferers were classified as having migraine without aura, migraine with aura, or nonmigraine headache.

The researchers found that, overall, 17% of women reported having migraine headaches—63% of whom also had aura symptoms—while less than 6% of men reported having migraines. MRI scans showed that women were also more likely than men to have infarct-like lesions, and that women who reported having migraines with aura were almost twice as likely to have such lesions on follow-up as women who did not report having headaches. (There was no real difference in the rate of these lesions in men.) The findings held up even after taking into account cardiovascular risk factors and history of cardiovascular disease. Results were published in *The Journal of the American Medical Association* (June 24, 2009).

Studies by researchers at Harvard suggest that women who have frequent migraines with aura are also at increased risk for stroke. However, according to the scientists involved in those studies, the mechanisms leading to infarct-like lesions in the cerebellum are unlikely to be the same as those involved in stroke. For now, infarct-like lesions are little more than a finding on an MRI. Much more research is needed to determine whether migraine with aura causes these lesions and whether they have any effect on physical health or brain function. ♥



## Soy extracts don't improve bone density in older women

Soy once looked like the kinder, gentler alternative to hormone therapy for menopausal symptoms and risk reduction. Many population studies suggested that women who regularly ate soy products had not only fewer hot flashes but also a lower risk of developing heart disease and osteoporosis. This apparent power of soy has been attributed to its estrogen-like effects.

Scientists seeking to isolate the chemical components in soy that are responsible for its seeming benefits have homed in on soy protein and isoflavones. Studies with isoflavones suggest that the compounds act preferentially in bone. And a few studies have shown that isoflavones increase bone mineral density in perimenopausal women. But findings have been inconsistent or lacking in older women—in particular, women 10 years or so past menopause, the time when fracture risk starts rising dramatically.

Now researchers at the University of Connecticut have studied the effects of isoflavones on bone loss in women over age 60. They divided 97 healthy women into four groups and assigned each for a year to one of the following daily regimens: 18 grams (g) of soy protein (about the amount in one cup of tofu) plus 105 milligrams (mg) isoflavone; 18 g of animal protein (about the amount in a 3-ounce serving

of salmon) plus 105 mg isoflavone; 18 g of soy protein plus placebo; or 18 g of animal protein plus placebo. The protein (soy or animal) was consumed as a powder mixed into food and beverages; the isoflavone or placebo was in the form of three 35-mg pills daily. All the women were told to get at least 1,200 to 1,500 mg of calcium per day.

At the beginning of the study, the women underwent bone density testing with dual energy x-ray absorptiometry (DXA) and blood tests for enzymes that indicate bone remodeling activity. During the study their blood was tested for isoflavones to make sure they were taking the pills and powder as directed.

After a year, average bone mineral density had declined equally in all four groups, and bone remodeling enzymes were equally active in all four groups. The researchers concluded that adding soy protein or isoflavone supplements to the diet doesn't build bone or prevent bone loss in older postmenopausal women. Results were published in *The American Journal of Clinical Nutrition* (July 2009).

Soy is a good source of protein, but women over age 60 with osteoporosis should talk to their clinicians about other options, including bisphosphonates and synthetic parathyroid hormone (teriparatide, or Forteo). ♥

## Endometrial ablation is shown to be safe and effective

Menorrhagia (abnormally heavy menstrual bleeding) isn't just uncomfortable or inconvenient—it can also lead to fatigue and anemia. When it's a symptom of a condition such as fibroids or endometrial cancer, it can be relieved by treating the underlying problem. When heavy periods have no known cause, women have other options, including hormonal drugs, which preserve the ability to have children, and hysterectomy, which removes the uterus. For women who are no longer interested in childbearing, another option has emerged in the last 20 years: endometrial ablation—the elimination of the endometrium, or uterine lining. This procedure is less invasive than hysterectomy and can be performed on an outpatient basis.

Until recently, there's been little evidence on the long-term results of endometrial ablation. A study in the May 2009 *British Journal of Obstetrics and Gynecology* helps fill the gap. Researchers reported on a 10-year follow-up of women who underwent either of two common ablation methods—transcervical resection of the endometrium (TCRE) or microwave endometrial ablation (MEA). Whichever procedure they underwent, most of the women were happy with the results. They reported less menstrual bleeding and pain and overall improved quality of life.

In the study, which began in 1996 at Aberdeen Royal Infirmary in Scotland, 263 women with menorrhagia, average age 41, who had completed childbearing were randomly assigned in roughly equal numbers to undergo either TCRE or MAE. Both procedures were performed under general anesthesia. In TCRE, electric cauterization instruments are used to remove the endometrium and seal off blood vessels. In MAE, a microwave wand is used to heat the uterus until the endometrium is destroyed.

Both procedures were effective, but women who had microwave ablation reported slightly greater satisfaction and were somewhat less likely to need further surgery. The researchers reported that 10 to 12 years after the procedure, 82% of the MEA group and 74% of the TCRE group felt totally or generally satisfied. During the follow-up period, 22 of the 129 women in the MEA group and 38 of the 134 women in the TCRE group underwent hysterectomy, for either endometriosis, fibroids, or excessive bleeding with no apparent cause. None of the women developed endometrial cancer.

More studies are needed to compare these procedures with the long-term effects of other ablation techniques, including the use of radio waves, freezing, and hot water. ♥



**Is a tanning bed safer than sunlight?**

**Q** Does tanning in a tanning bed cause less damage than natural sunlight?

**A** It doesn't matter whether you get it from the sun or from artificial sources such as sun lamps and tanning beds—ultraviolet (UV) radiation is linked to skin cancers (including basal cell carcinoma, squamous cell carcinoma, and melanoma) and to other sorts of skin damage, particularly premature skin aging (photoaging).

UV radiation is one part of the spectrum of light that reaches the earth from the sun. At the UV end of the spectrum, the wavelengths are too short to be visible to the naked eye. They range in length from 100 to 400 nanometers (nm, or billionths of a meter) and are classified—from the longest to the shortest—as UVA (320 to 400 nm), UVB (290 to 315 nm), and UVC (100 to 280 nm). UVA rays, which penetrate deep into the skin, are responsible for tanning. UVB rays damage superficial skin cell layers, causing sunburn. UVC rays, the shortest, are considered harmless, since most UVC light is absorbed by ozone in the upper atmosphere and thus does not reach the earth. Of the UV solar radiation that does reach the earth, up to 95% is UVA, and about 5% is UVB. For years, scientists believed UVB rays were the most harmful, because sunburn is linked to melanoma, the deadliest form of skin cancer. But in the last 20 years, we've learned that UVA rays also increase skin cancer risk—and they are the main cause of photoaging.

Tanning beds use fluorescent bulbs that emit mostly UVA, with smaller doses of UVB. The UVA radiation is up to three times more intense than the UVA in natural sunlight, and even the UVB intensity may approach that of bright sunlight.

We first learned about the harmful effects of sunlight from long-term population studies. Our understanding of the risks associated with tanning beds has developed more slowly, because they are a relatively recent phenomenon, first appearing commercially in the United States during the late 1970s. In the last 10 years, however, mounting evidence has shown a link between tanning bed use and all skin cancers. In 2002, a National Cancer Institute study found that use of an indoor tanning device was associated with a 50% increase in the risk of basal cell carcinoma and a more than 100% increase in the risk of squamous cell carcinoma.

In 2007, the International Agency for Research

on Cancer analyzed 19 studies on indoor tanning and the risk for melanoma. It concluded that people who started indoor tanning before age 35 had a 75% greater risk of developing melanoma. Since 2003, UV radiation from any source has been listed by the U.S. National Toxicology Program as a known carcinogen (cancer-causing substance). Currently, many government agencies caution against tanning.

Laboratory research has helped us understand how tanning affects skin cells. Both UVB and UVA rays damage the cells' DNA, potentially causing mutations that may lead to cancer. This same DNA damage is the cause of tanning. In other words, tanning itself is a sign of DNA damage in the skin.



Despite the clear evidence that it's unsafe, the use of tanning beds is on the rise. Nearly 30 million people in the United States tan in salons every year, most of them women between the ages of 16 and 49. Surveys show that many people understand the risks but continue to tan because they think it makes them look healthy.

Meanwhile, the tanning industry makes misleading claims for the healthfulness of indoor tanning. One claim is that it helps build a base that protects against sunburn. It does, but only slightly—the equivalent of a sunscreen rated SPF 4 or less. Another claim is that tanning is a good way to stimulate the skin's production of vitamin D, a hormone that's essential to bone health and has been linked to a reduced risk for several cancers. But you can get all the vitamin D you need in a daily vitamin D supplement, which offers all the benefits without any of the risks to your skin.

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