

# Complementary Therapies in CHRONIC CARE™

Practical Applications of Alternative Medicine for CHF, Diabetes, and Chronic Disease

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## Risks outweigh benefits of popular dietary, athletic supplement

*Researchers say risk outweighs benefits of weight loss, athlete's aid*

**R**eports of serious cardiovascular and central nervous system events and even death in apparently healthy young people who began using ephedra, a dietary aid and athletic performance enhancer, has led the *New England Journal of Medicine (NEJM)* to release an article warning of possible dangers six weeks before the expected publication date.<sup>1</sup>

"Because of its potential public health implications, this article is being released before its publication date. The final version of the report will be published later this month on Dec. 21," said *NEJM* editors when they released the University of California at San Francisco (UCSF) study Nov. 6.

"There is no proven benefit of weight loss or enhanced athletic performance with the use of ephedra, but there are numerous potential risks of cardiovascular and central nervous system events for certain individuals," says study author **Neal Benowitz, MD**, chief of UCSF's division of clinical pharmacology and experimental therapeutics. "In my mind, the risk outweighs any benefits."

A review of adverse event reports submitted to the U.S. Food and Drug Administration (FDA) linked the popular herbal product, sometimes known by its Chinese name ma huang, to hypertension,

### KEY POINTS

- Ephedra use can cause cardiovascular and central nervous system events, even in healthy young people using the herb for weight loss and to enhance athletic performance.
- A review of the adverse events reported to the U.S. Food and Drug Administration (FDA) links ephedra use to hypertension, heart attack, stroke, palpitations, and seizures. Ten patients died, and 13 were permanently disabled.
- The FDA says it will decide by the end of the year whether to impose restrictions on the use of ephedra or to commission further research.

tachycardia, heart attacks, strokes, and seizures. Benowitz linked ephedra to 10 deaths and 13 cases of permanent disability. The review was commissioned by the FDA.

Benowitz estimates that last year, 12 million people in the United States used products containing ephedra marketed under hundreds of brand names, including Ripped Fuel (used by bodybuilders attempting to increase muscle mass) and the well-known Metabolife and Diet-Phen weight control aids. Many of the supplements also contain caffeine, which Benowitz contends enhances the effects of ephedra.

Ephedra can cause particular risk in people with cardiovascular disease, hypertension, hypothyroidism, and renal disease, he says. "The risks are low, but there are potentially catastrophic results. I wouldn't recommend it to anyone."

Cardiovascular symptoms made up 47% of the adverse events examined by Benowitz and his colleague **Christine A. Haller**. Hypertension was the most frequent effect among those who suffered adverse events after taking the preparations for relatively short periods of time (a few days to a few weeks). Most of those affected were young and without previously diagnosed cardiovascular or central nervous system disease.

Benowitz and Haller reviewed records of 140 ephedra users who suffered complications from 1997 through 1999 and found approximately one-third of the problems definitely or probably were caused by ephedra and another one-third possibly were caused by it. One-fifth of the cases were discarded because of insufficient information, and the remainder were determined to be unrelated to ephedra use. Two pregnant women lost their babies while taking products containing ephedra. At least 54 deaths and about 1,000 reports of complications have been linked to ephedra since the mid-1990s.

The Associated Press (AP) quoted Joseph Levitt, an FDA food safety director, as saying the agency will decide by the end of the year whether to impose restrictions on ephedra or to commission further research.

The AP also quoted John Hathcock of the Washington, DC-based Council for Responsible Nutrition, a trade group for supplement makers, as criticizing the criteria Benowitz and Haller used to classify which complications were probably caused by ephedra. He also told the AP that a soon-to-be-published study by other researchers found no link between ephedra use and those types of complications.

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1. Haller CA, Benowitz N. Adverse cardiovascular and central nervous system events associated with dietary supplements containing ephedra alkaloids. *N Engl J Med* 2000; Dec. 21 (In press). ■

## Transplant patients can improve quality of life

### *Walking back to better health and productivity*

**M**ore and more, exercise seems to be the answer to almost all health issues. Now it is being seen as an important answer even in an area where there was a body of thought that exercise might be detrimental: transplantation.

It appears that exercise is good for the organs, even if those organs once belonged to someone else. And as managed care increasingly is returning care of transplant patients to primary care physicians, transplant surgeons are eager for the word to get out. "Encourage your patients to exercise. At the very least, it will help keep their weight under control, raise HDL cholesterol, and improve quality of life," says **Jon Kobashigawa**, MD, medical director of the University of California-Los Angeles (UCLA) heart transplant program.

Immunosuppressant drugs, upon which virtually all transplant patients are dependent, have some very distressing side effects, including hypertension and hyperlipidemia and may cause myopathy, making it difficult for patients to exercise. In addition, cyclosporin, a steroid, causes weight gain, sometimes as much as 50 pounds in the aftermath of surgery. In addition immobility leads to increased morbidity due to infections and inability to mobilize air in the lungs.

"Many of these patients have diabetes, and often they were obese before a heart or kidney transplant. Add on postoperative weight gain, hypertension, and hyperlipidemia, and people with diabetes have got three strikes against them," Kobashigawa says. He is clinical professor of medicine/cardiology at UCLA and co-chief of the division of clinical faculty medicine. "In fact, 25% of the deaths of kidney transplant patients are due to cardiovascular causes."

Kobashigawa, lead author of the first study to show the benefits of exercise for heart transplant patients, says he and his UCLA colleagues

designed their study as a response to the government's denial of coverage of rehabilitation for heart transplant patients. He notes that Medicare will pay for rehabilitation for heart bypass and congestive heart failure patients, but not for heart transplant patients.<sup>1</sup>

In some medical circles, it is believed that denervated transplanted hearts respond abnormally to exercise and exercise tolerance is reduced, wrote Kobashigawa.

Transplanted hearts don't respond to exercise in exactly the same manner as normal hearts because they don't respond immediately to stress by beating faster. Instead, the heart responds initially by contracting harder to pump blood and then starts to beat faster after a few minutes in response to higher adrenaline levels.

"This is an extremely important result because we have shown that transplanted hearts can be trained and that moderate exercise is effective, even early after transplantation," he says.

Kobashigawa's team assigned 14 heart transplant patients to a cardiac-rehabilitation exercise group just two weeks after their transplant surgery. A control group of 13 patients at the same stage of recovery underwent unstructured therapy at home and were given no specific exercise instructions. Each patient in the exercise group was given an individualized program of muscular strength and aerobic training under the guidance of a physical therapist.

The group assigned to exercise had been on transplant lists longer and therefore might be presumed to be in weaker physical condition at the time of transplant, Kobashigawa says.

Patients in the exercise group visited the cardiac rehab clinic three times a week and received specific instructions for exercising at home. The frequency of visits to the rehab clinic was reduced as patients became more independently involved in their home exercise programs. In addition to stretching exercises and calisthenics, patients were asked to follow this walking regimen:

- **First week after discharge** (usually about two weeks after surgery) — Walk five to 10 minutes three times a day at a comfortable pace without stopping.
- **Week 2** — Walk 10 to 15 minutes three times a day.
- **Week 3** — Walk 15 to 20 minutes twice a day.
- **Week 4** — Walk 20 to 30 minutes once a day.
- **Week 5** — Walk 30 to 40 minutes once a day.
- **Week 6** — Continue walking 30 to 40 minutes a day while increasing the pace.

Cardiopulmonary exercise stress tests were performed at one month after surgery and six months.

Six months after surgery, the exercise group had a 49% increase in peak oxygen consumption vs. 18% for the control group. More significantly, the exercise group had a 59% improvement in workload capacity compared to 18% for the control and a greater reduction in ventilatory equivalent for carbon dioxide (20% for exercisers vs. 11% for controls).

The mean dose of prednisone, the number of patients taking antihypertensive medications, and the average number of episodes of rejections and of infection did not differ during the study period for both groups. Weight gain did not differ significantly between the groups.

"This study shows that moderate exercise can increase transplant patients' capacity for physical work, but I would recommend against high intensity exercise, which may contribute to sudden death," says Kobashigawa.

### *Standard care for transplant patients?*

He says a key element of the study was the early initiation of exercise therapy within a very short time after transplant surgery. "Exercise should be considered standard postoperative care for heart transplant patients."

Similar exercise recommendations have been made for patients with virtually all other types of organ transplants: kidney, liver, pancreas, lung, and bone marrow. Among them, a study from UCSF concluded that athletes at the 1996 U.S. Transplant Games, while not representative of the general population, had achieved near-normal levels of physical functioning and quality of life. It also suggested that transplant patients who participate in regular physical activity can achieve above-normal levels of physical function.<sup>2</sup>

While heart transplant patients may have performance limitations, other transplant recipients should be able to achieve peak fitness, says **Lew Teperman**, MD, transplantation director at New York University in New York City.

Yet there are some caveats or precautions that should be taken for transplant recipients engaging in exercise programs, says Teperman. "After most kinds of transplants, immunosuppressants may cause bone brittleness, so any kind of contact sport should be avoided.

"People feel better after exercise, so in addition to improving their physical condition, they are likely to be in a better mental state."

Teperman also warns that patients should not begin to exercise until they are sufficiently healed and they should work up to an exercise regimen gradually. "Many patients are quite debilitated when they finally get a transplant, so it is important to recognize their state of general health in implementing an exercise program."

A proper exercise program, physicians say, can bring heart transplant patients to a level of fitness that is approximately 80% of what might be expected of a person with his own heart, and the difference might not be noticeable except to elite athletes.

The issue of athletic performance by transplant patients was underscored in the past year. NBA All-Star forward Sean Elliott of the San Antonio Spurs developed kidney disease and received a kidney donated by his brother, Noel, in August 1999. Elliott said he felt great a month after surgery and began exercising. Despite a bout with pneumonia in December, Elliott persevered. By Feb. 2, he was back to full-contact workouts with his team. Saluted by standing ovations from fans, he returned to professional basketball on March 14, just seven months after his transplant, and became the first professional athlete to return to a sport after receiving an organ transplant.

"Seven months doesn't seem like a long time," Elliott told ESPN News the night of his return to basketball. "I'm just pleased that I've made it this far, to be honest with you, especially with the several speed bumps I went through to get here."

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## This transplant patient has no lead in his feet!

**M**ike Foley is quick to admit he's not your typical transplant patient — nor is he your typical athlete.

At the age of 40, with one kidney and two pancreas transplants under his belt, Foley runs an average of 25 miles a week, competes at least a couple of times a month, and plans to compete on

behalf of the United States at next summer's World Transplant Games in Japan.

Not being able to compete in the U.S. Transplant Games last June was a big disappointment for Foley, but not that big. "I got my second pancreas in May, and the rules say you can't compete for six months after a transplant. It was a choice, to take the pancreas and miss the Games, but what a relief not to have to test several times a day and not have to use insulin at all," says Foley, a reporter for the *Greenville (SC) News*.

However, Foley has compared his current times with the winning times at the U.S. Games and says he could have won the 1 km and 5 km races and placed third in the half-mile. "I don't know how that will translate in the world events, but I expect to be very competitive next summer."

## Bitten by the racing bug

His physicians at the Medical University of South Carolina in Charleston don't know, but just five weeks after the second transplant, Foley traveled into the mountains for a race in North Carolina, ostensibly just to watch his wife compete. But he got bitten by the racing bug and joined the race; he ran most of the way over a strenuous course that climbed 2,000 feet.

"I had been walking up to three hours a day, and I was really itching to get back out there," says Foley with a grin. "They wanted me to wait at least six weeks, but I just couldn't do it. I was tired afterward, but it felt great!"

Diagnosed with Type 1 diabetes at the age of 20, he already had been running competitively for six years and was a member of the track team at Michigan State University, winning medals in almost every event he entered. "I know I blew the dietitian's mind because I was running 100 miles a week and eating about 10,000 calories a day," says the rail-thin Foley. "They tried to put me on an 8,000 calorie diet, but it just didn't work, so they let me eat what I needed, and we adjusted the insulin around my exercise patterns. It took a while to get things on an even keel."

Foley didn't let diabetes get him down. It didn't even slow him down for another 10 years, when renal failure threatened his life. Even then, physicians said Foley would need a transplant within three to five years, but he was able to hold off dialysis for seven years and had his kidney-pancreas transplant two years later.

The first pancreas failed after just 36 hours, but the kidney is functioning well 18 months after the

initial surgery, and Foley is still running. Even with the surgery this year, by the end of October, he had already competed 30 times this year, and his times are improving with each race.

"I'm not in contention with the leaders anymore, but now at least they are within sight at the end of the race," he says. He's now completing a 5 km race in about 22 minutes and expects to be in top form by next summer with a goal of completing that distance in 20 minutes.

"That's a pretty good time for a 40 year-old," quips Foley. "But I was much faster in my youth. I don't know if I slowed down because of age or the transplants or the diabetes and kidney failure." It doesn't sound like Foley has slowed down much at all. ■

## The biggest bang for the buck against hypertension

By **Ralph Hall, MD**  
Emeritus Professor of Medicine  
University of Missouri-Kansas City

**H**ow much, what kind, and how effective is exercise in treating hypertension? Hypertension is one of the most important risk factors for cardiovascular disease, stroke and end-stage kidney disease. The Joint National Committee Report on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends exercise as a significant component of the treatment of high blood pressure (BP).<sup>1</sup>

Hypertension affects more than 42 million people in the United States, and it's the most common reason for outpatient visits.<sup>2</sup> However, there are significant costs, difficulty with adherence, and often significant adverse events from the drugs used to treat hypertension. Therefore, nonpharmacologic approaches to treating hypertension are receiving more attention. But how effective are they?

In reviewing the literature covering exercise and hypertension, it is difficult to compare studies. There is great variation in the age, sex, and ethnicity, of the subjects and a marked difference in the intensity, duration, and whether the exercise was accompanied by weight loss and/or sodium restriction.

In their recent review, Hagberg and colleagues conclude that "approximately 75% of the subjects

studied reduced systolic and diastolic BPs, which averaged 11 mm Hg and 8 mm Hg, respectively."<sup>3</sup> They also noted that women may reduce their BP more than men and that middle-aged people seemed to obtain better benefits than young or older people.

A recent study is important in that it differentiates weight loss plus exercise from an exercise-only program, which Hagberg did not do. The study started with 133 sedentary, overweight men and women with unmedicated, mild hypertension and concludes that "although exercise alone was effective in reducing blood pressure, the addition of a behavior weight loss program enhanced this effect."

The subjects in the study included 59 men and 74 women, 23% of whom were black, starting at age 29. The average patient age was 47. BPs were obtained four times on three separate visits with the first measurement being discarded.

The last three pressure measurements were averaged and represented the clinic visit BP. The subjects also underwent ambulatory BPs monitoring from early morning until bedtime and had measurements taken of cardiac output and peripheral resistance.

The subjects then were randomized to three treatment groups. The groups were divided into an exercise-only group, a control group, and an exercise-plus-behavioral-weight management group. The subjects exercised three to four times per week at 70% to 85% of their heart rate reserve, as determined at the time of an initial treadmill test.

Participants in the weight-management group had an average 7.4/5.6 mm Hg reduction in their clinic systolic/diastolic BP as compared to a 4.4/4.3 mm Hg reduction in the exercise-only group. Those in the weight-management group also consumed less sodium during the experiment.

Fasting blood glucose and insulin levels were also lower in both exercise and the exercise-plus-diet groups following the study. The weight-loss-plus-exercise group had a statistically different improvement in treadmill time and peak oxygen consumption. Both groups responded to stress with less rise in their BP readings after their training.

Another recent study of diet and its effect on hypertension is worth noting.

**Paul Conlin, MD**, and fellow researchers at the endocrinology-hypertension division at Brigham

*(Continued on page 68)*

# DASH Diet

## Diet Overview

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This eating plan is from the "Dietary Approaches to Stop Hypertension" (DASH) study. It is rich in fruits, vegetables, and low-fat dairy foods, and low in saturated and total fat. In a report in the April 17, 1997, issue of *The New England Journal of Medicine*, the DASH diet lowered blood pressure and may help prevent and control high blood pressure.



The research centers in DASH were the Brigham and Women's Hospital, Boston; Center for Health Research, Portland, OR; Duke University

Medical Center, Durham, NC; John's Hopkins University, Baltimore; and Pennington Biomedical Research Center, Baton Rouge, LA. The National Heart, Lung and Blood Institute was both a partner in the research and provided funding for the study.

The DASH eating plan shown below is based on 2,000 calories a day. Depending on your caloric needs, your number of daily servings in a food group may vary from those listed.

### Tips on Eating the DASH Way

- ♥ Start small. Make gradual changes in your eating habits.
- ♥ Center your meal around carbohydrates such as pasta, rice, beans, or vegetables.
- ♥ Treat meat as one part of the whole meal, instead of the focus.
- ♥ Use fruits or low-fat, low-calorie foods such as sugar-free gelatin for desserts and snacks.

### Remember!

If you use the DASH diet to help prevent or control high blood pressure, make it a part of a lifestyle that includes choosing foods lower in salt and sodium, keeping a healthy weight, being physically active and, if you drink alcohol, doing so in moderation.

### Make DASH work for you!

The DASH diet, based on a 2,000-calorie diet, contains the number of servings from each of the food groups shown in the table. Depending on your caloric needs, the number of servings may vary.

Food Group	Daily Servings	Serving Equals	Examples & Notes
Grains and grain products	7-8	1 slice bread 1/2 C dry cereal 1/2 C cooked rice, pasta, or cereal	whole wheat breads, English muffin, pita bread, bagel, cereals and fiber, grits, oatmeal
Vegetables	4-5	1 C raw leafy vegetable 1/2 C cooked vegetable 6 oz vegetable juice	tomatoes, potatoes, carrots, peas, squash, broccoli, turnip greens, collards, kale, spinach, artichokes, beans, sweet potatoes
Fruits	4-5	6 oz fruit juice 1 medium fruit 1/4 C dried fruit 1/2 C fresh, frozen, or canned fruit	apricots, bananas, dates, grapes, oranges, orange juice, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, prunes, raisins, strawberries, tangerines
Low fat or nonfat dairy foods	2-3	8 oz milk 1 cup yogurt 1.5 oz cheese	skim or 1% milk, skim or low-fat buttermilk, nonfat or low-fat yogurt, part-skim mozzarella cheese, nonfat cheese
Meats, poultry, fish	2 or less	3 oz cooked meats, poultry, or fish	select only lean; trim away visible fats; broil, roast, or boil, instead of frying; remove skin from poultry
Nuts	1/2	1.5 oz or 1/3 C 2 tbsp seeds 1/2 C cooked legumes	almonds, filberts, mixed nuts, peanuts, walnuts, sunflower seeds, kidney beans, lentils

## Sample DASH Diet

Breakfast			Dinner		
Food	Amount	Servings	Food	Amount	Servings
orange juice	6 oz	1 fruit	herbed baked cod	3 oz	1 fish
1% low-fat milk	8 oz	1 dairy	scallion rice	1 C	2 grains
corn flakes (with 1 tsp. sugar)	1 C	2 grain	steamed broccoli	1/2 C	1 vegetable
banana	1 medium	1 fruit	stewed tomatoes	1/2 C	1 vegetable
whole wheat bread (with 1 tbsp jelly)	1 slice	1 grain	spinach salad:		1 vegetable
soft margarine	1 tsp	1 fat	raw spinach	1/2 C	
			cherry tomatoes	2	
			cucumber	2 slices	
			light Italian salad dressing	1 tbsp	1/2 fat
			whole wheat dinner roll	1 small	1 grain
			soft margarine	1 tsp	1 fat
			melon balls	1/2 C	1 fruit
Lunch			Snack		
Food	Amount	Servings	Food	Amount	Servings
chicken salad	3/4 C	1 poultry	dried apricots	1 oz (1/4 C)	1 fruit
pita bread	1/2 slice, large	1 grain	mini-pretzels	1 oz (3/4 C)	1 grain
raw vegetable medley:		1 vegetable	mixed nuts	1.5 oz (1/3 C)	1 nuts
carrot & celery sticks	3-4 sticks each		diet ginger ale	12 oz	
radishes	2				
loose-leaf lettuce	2 leaves				
part-skim mozzarella cheese	1.5 slice (1.5 oz)	1 dairy			
1% low-fat milk	8 oz	1 dairy			
fruit cocktail in light syrup	1/2 C	1 fruit			

and Women's Hospital in Boston, studied a group of patients with hypertension with systolic BP of 140 mm Hg to 159 mm Hg and/or diastolic BP of 90 mm Hg to 95 mm Hg.

Participants were randomized to receive for eight weeks either the control diet; a diet rich in fruits and vegetables, but otherwise similar to control; or a combination diet rich in fruits, vegetables, and low-fat dairy products, including whole grains, fish, poultry, and nuts, and reduced in red meats, sweets, and sugar-containing beverages. Sodium intake and weight were held constant throughout the study.

The combination diet significantly reduced systolic BP 11.1 mm Hg and diastolic BP 5.5 mm Hg. The fruits and vegetable diet also reduced systolic BP 7.2 mm Hg and diastolic BP 2.8 mm Hg. Researchers concluded that the DASH diet (Dietary Approaches to Stop Hypertension) may be useful in achieving control of Stage one hypertension. (See overview and sample meal plans, pp. 66-67.)

You could presume that reducing sodium and weight loss would have decreased BP even more in a few selected individuals. It would be interesting to see how much exercise, in addition to the DASH diet, will decrease the BP.

In the studies reviewed by Hagberg and colleagues, Asian and Pacific Island patients were more successful in reducing their BPs with exercise, more so than Caucasian patients. African-American patients also experienced significant reductions in their pressures with exercise training. They also note that in some studies there was a reduction in pathological left ventricular hypertrophy with exercise.

It's obvious that other risk factors should be considered and treated in hypertensive patients. Endurance training improves lipid profiles especially if treated for longer periods of time.<sup>4</sup> High-density lipoproteins often fail to change if treated for less than four to six months. That is in contrast to BP, which responds to exercise of moderate intensity and duration. In addition, high density lipoprotein responses to exercise are greatest in those with longer duration and higher intensity of exercise.

In the past, many physicians were satisfied with BPs of 140/90 mm Hg. The recent United Kingdom Prospective Diabetes studies on BPs in Type 2 diabetes demonstrated a marked drop in the incidence of both macrovascular and microvascular disease

in patients whose BPs were lowered from 154/87 mm Hg to 144/82 mm Hg.<sup>5</sup> Data would indicate that more realistic goals are to reach BP levels of 130/80 mm Hg if possible.

My recommendation is to prescribe endurance exercise for five or six days per week and two to three days per week decrease the amount of endurance exercise and replace it with resistance training. The resistance training can be performed at 40% to 50% of maximum repetition capacity.

### **Resistance training is beneficial, too**

This intensity, according to Hagberg's studies, does not elevate BP and maintains strength. This is especially true for older patients. Resistance training also has the favorable effect on lipids that occur with endurance exercise. Diets are difficult to change, but the DASH diet would seem to have significant benefits, both in terms of hypertension and macrovascular disease.

As Hagberg and colleagues point out, "These results continue to support the recommendation that exercise training is an important initial or adjunctive step that is highly efficacious in the treatment of individuals with mild to moderate elevations in blood pressure."

The benefits of exercise in the prevention of cardiovascular disease are well-documented. Let's make sure our patients benefit from this simple and inexpensive therapy — exercise and diet.

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# Chronic pain treatments lack scientific evidence

*MSM and DMSO widely used for variety of pain*

**B**ack in the '60s and '70s, athletes suffering from injuries and muscle pain swore by dimethyl sulfoxide (DMSO), a sulfur-based solvent commonly used as a veterinary liniment that had patients rushing to the offices of alternative practitioners for a supplement that they swore relieved their pain.

As the word about DMSO got out, people began flocking to clinics dispensing DMSO, up to 100,000 of them seeking relief for arthritis, bursitis, tendinitis — benefits never clinically proven, but about which adherents of the treatment are adamant.

After DMSO was linked to ocular toxicity in experimental animals, the U.S. Food and Drug Administration (FDA) stopped human use and only permitted gradual resumption after clinical trials found ocular complaints were not present in humans. While DMSO is not commonly used in the United States, more than 30 million patients in Russia obtain prescriptions there each year to treat lupus, scleroderma, arthritis, and diabetic ulcerations, according to **Stanley Jacob**, MD, professor of surgery at Oregon Health Sciences University in Portland.

Jacob is the co-author of *The Miracle of MSM* (methylsulfonylmethane) with neurologist **Ronald Lawrence**, MD, PhD, a founding member of the International Association for the Study of Pain and the American Association for the Study of Headaches, and health writer **Martin Zucker**.<sup>1</sup>

As a topical application, DMSO is used as a carrier to reduce inflammation and carry medications quickly through the skin in trauma situations, says Jacob.

“DMSO is not really a drug. It’s more like a multifunctional therapeutic principle, an agent with hundreds of properties and applications in the body,” says Jacob. “It’s safe, a substance of extraordinarily low toxicity, without a single documented death attributed to it.”

DMSO does cause an unpleasant fish-like taste in the mouth, which sometimes causes patients to discontinue its use, and it has been associated with skin irritation.

Enter the new generation of pain relief: MSM, a chemical cousin of DMSO. When DMSO enters the body, Jacob says, 15% of it is converted into

MSM — a substance that remains in the body four times as long as DMSO, possibly because of more extensive tissue binding, according to researchers who did lab analyses of both substances in the late 60s. Jacob theorizes that the benefits of DMSO are due to the long-lasting influences of its conversion into MSM — a substance for which he attributes these actions:

- It is an analgesic.
- It is anti-inflammatory.
- It’s a carrier — passing through the cellular membranes including the skin.
- It dilates blood vessels and increases blood flow.
- It’s a cholinesterase inhibitor, which Jacob says he has seen restore peristalsis, providing swift relief of constipation.
- It is anti-spasmodic, which creates a muscle-relaxing effect.
- It alters cross-linking processes in collagen, thus reducing scar tissue.
- It possesses antiparasitic properties, particularly for giardia, a protozoan parasite that causes diarrhea.
- It has an immune normalizing property as observed in its effectiveness against autoimmune diseases such as rheumatoid arthritis, lupus, and scleroderma.

“MSM offers a natural way to reduce pain and inflammation without serious side effects. It may even deliver as much or more relief as some of the standard painkillers. It just doesn’t work as fast, but patients often begin to experience noticeable easing of pain and discomfort within days,” says Jacob.

He uses MSM for a wide variety of chronic pain conditions ranging from osteoarthritis to chronic back pain to chronic headaches, fibromyalgia, tendinitis, sinusitis, allergies, and heartburn.

Since 1978, Jacob has treated 18,000 patients with MSM at his clinic in Portland without serious side effects, but he’s the first to say, “You won’t find a good clinical study in the literature.”

That’s the rub, according to **Sharon Kolasinski**, MD, assistant professor of medicine and chief of the clinical service in the division of rheumatology at the University of Pennsylvania School of Medicine in Philadelphia.

“The problem is we just don’t know how good MSM is. There just aren’t clinical studies,” says Kolasinski, “So anecdote remains anecdote.”

Kolasinski concluded in an article in *Alternative Medicine Alert*, a sister publication of *Complementary Therapies in Chronic Care*, in October:

“DMSO remains available worldwide and is approved for use for arthritis in a number of countries. However over-the-counter preparations in the U.S. are graded for industrial use and may contain impurities. A pharmacological grade solution is available by prescription and approved for intravesicular use for interstitial cystitis. Decades-old uncontrolled clinical observations suggest that topical application can be associated with analgesia for a number of musculoskeletal indications, but associated cutaneous side effects may be frequent.

“MSM is a popular substance for the treatment of numerous conditions, but recent interest has been for the treatment of musculoskeletal conditions. It is chemically related to DMSO, which enjoyed its own popularity as a cure-all in the 1960s, but has fallen into disuse. It is unclear how many chemical and biological properties MSM shares with DMSO. Scientifically acceptable data about the use of these substances in the treatment of human disease are lacking. Virtually no information is available regarding in vitro or clinical effects of MSM,” she writes.

Kolasinski’s recommendations include:

- DMSO should be avoided since all nonprescription formulations are graded for other than human use.
- Prescription DMSO should be used under medical supervision, and patients should be aware that side effects are frequent.
- Since it is not known what effects MSM has in the body, whether it has efficacy in the treatment of human disease or what its short- or long-term side effects are, MSM cannot be recommended.

MSM is widely available in capsules and crystals for oral administration or as lotions, creams, and gels, to be used topically. Jacob recommends taking 2 g to 3 g a day for general health maintenance.

“For deep-seated conditions, patients may need higher doses, sometimes much higher — in the range of 40 g or 60 g under our personal supervision — to experience relief,” adds Jacob.

One of MSM’s greatest proponents is actor James Coburn, who was diagnosed with crippling rheumatoid arthritis and began taking 1.5 g of crystal MSM in 1998. After six months, the 70-year-old

actor said he had “virtually no pain at all” and he is working with a personal trainer in hopes of returning to playing tennis — something he has not been able to do for 20 years.

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## Lycopene as cancer preventive gains credence

*Growing evidence shows carotenoid’s effectiveness*

**F**olks who love lots of spaghetti with tomato sauce and who slather salsa liberally on their tacos appear to be getting a strong dose of cancer-preventing antioxidants — and maybe something more.

A growing body of evidence links lycopene to a reduced risk of breast, prostate, lung, and stomach cancers, as well as protection against heart disease, age-related macular degeneration, and other age-related problems.

Lycopene, the major carotenoid that gives tomatoes their red color, has been examined in more than 70 studies, which show it neutralizes free radical oxygen molecules before they can cause cell damage. There’s a strong body of evidence that shows that free radicals — natural byproducts of life that can be exacerbated by exposure to smoking, poor dietary habits, emotional stress, and environmental pollutants — contribute to numerous degenerative diseases.

“The consistency of results across studies of varied populations and study designs argues against bias or confounding factors as the explanation for these associations,” writes **Elizabeth Johnson**, PhD, of the Jean Mayer Human Nutrition Research Center on Aging at Tufts University in Boston.

Recent research from Israel has added to the evidence in favor of lycopene and perhaps sheds

## COMING IN FUTURE MONTHS

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some light on its mechanism of action.

“We have several ideas about what’s happening here, but probably the most promising is that it interferes with the insulin-like growth factor signaling system and slows or stops reproduction of cancer cells,” says **Yoav Sharoni**, MD, professor of medicine at Ben-Gurion University of the Negev in Beer-Sheva, Israel.<sup>1</sup>

Sharoni says it is clear that in addition to lycopene’s antioxidant properties, it somehow dramatically reduces the cycle of cell division.

Sharoni’s tissue cultures responded dramatically to exposure to lycopene — reducing the risk of breast and prostate cancers four- to seven-fold.

Not all carotenoids have the same effect, says Sharoni, implying there must be some unique substance in lycopene that produces such potent effects. In fact, the Finnish Alpha Tocopherol Beta Carotene (ATBC) trial and the Beta-Carotene and Retinol Efficacy Trial (CARET) studies showed heavy smokers and asbestos workers developed an increased risk for lung cancer when they received high-dose beta-carotene supplements.<sup>2,3</sup>

“Our best guess is that lycopene somehow postpones the growth of cancer cells, but we don’t think it prevents the formation of cancer cells,” says Sharoni. “But postponing might mean that a cancer that would have otherwise appeared at age 60 or 70 might not appear until age 90 or 100. In my mind, that’s prevention.”

Sharoni currently is beginning clinical trials on lycopene and breast cancer.

Among the dozens of other studies showing a wide range of health benefits from lycopene:

- Research that was presented at the 1999 Annual Meeting of the American Association for Cancer Research showed that after taking 15 mg of lycopene twice a day for three weeks, men previously diagnosed with prostate cancer had smaller tumors and lower levels of PSA, a primary marker for prostate cancer.

- In the 48,000 subject Harvard Physicians’ Study, researchers found that men who ate more than 10 servings of tomato products a week had a 35% lower risk of prostate cancer than men who ate fewer than 1.5 servings.

- A 1997 study published in the *American Journal of Epidemiology* found that people with more lycopene in their bodies had a significantly lower risk of heart attack than those with lower lycopene levels.

- A Canadian study shows men who ate foods high in lycopene had significantly reduced LDL cholesterol levels after just one week.

- A study published in the *Archives of Ophthalmology* in 1995 showed that people with the lowest levels of lycopene were at the greatest risk of developing macular degeneration.

- Data from the ongoing Kentucky Nun Study of 88 elderly Catholic nuns found that those with the highest levels of lycopene had better cognitive function and retained their ability to care for themselves longer than those with lower levels.

- Tufts University researchers found that lycopene shields skin from damaging ultraviolet sunlight, improving skin protection by 46%.

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**AMERICAN HEALTH  
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There's every reason to encourage your patients to increase their consumption of lycopene-rich tomato products as well as other foods high in the nutrient, say the experts.

Lycopene is most bioavailable in cooked tomatoes, says **Phyllis Bowen**, PhD, associate professor of nutrition at the University of Illinois at Chicago. "For years, we've told people to eat as many fresh and raw vegetables as possible. But we've found that processing tomato products like spaghetti sauce and tomato juice make the lycopene 2.5 times more easily absorbed." What's more, the lycopene is not damaged even with hours of cooking, so spaghetti sauce or chili can be simmered for hours, she adds.

"For healthy people, getting at least 30 mg of lycopene in your diet every day is a great strategy for preventing heart disease," says biochemist **Sandiv Agarwal**, PhD, a research associate at the University of Toronto, author of the Canadian study on cholesterol and lycopene.<sup>4</sup>

"This is easily achievable in the normal diet without the need for supplements," says **Richard B. Van Breeman**, PhD, associate professor of medicinal chemistry at the University of Illinois in Chicago. He theorizes that the absorption of lycopene in the human body is very similar to the absorption of cholesterol, so the negative effect of excessive cholesterol can be cancelled out by sufficient lycopene consumption.

Here's the lycopene content of several common foods:

- **Tomato paste**, 42.2 mg in two tablespoons;
- **Spaghetti sauce**, nearly 22 mg in ½ cup;
- **Tomato ketchup**, more than 15 mg in one tablespoon;
- **Tomato juice**, 17 mg in an eight-ounce glass;
- **Watermelon**, 4 mg in a 10-inch by one-inch slice;
- **Pink grapefruit**, 4 mg in a half-grapefruit.

In addition, lycopene and tomato powder are available as supplements at health and nutrition centers in 5 mg and 10 mg capsules and tablets.

There have been no short-term side effects reported from the use of lycopene at these levels, but researchers say there has not yet been enough research to determine conclusively if long-term side effects can be associated with its use.

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## CE objectives

After reading *Complementary Therapies in Chronic Care*, the health care professional will be able to:

1. Identify management, clinical, educational, and financial advantages of complementary therapies for chronic care.
2. Describe how those therapies affect chronic patients and the providers who care for them.
3. Describe practical ways to incorporate complementary therapies into chronic disease management based on independent recommendations from clinicians at individual institutions. ■