Dr G's MediSense

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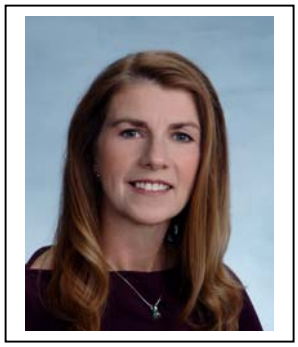

TYLENOL TOXICITY

by Ann Gerhardt, MD www.drgsmedisense.com

Bottom Line At The Top: If you like your liver, limit acetaminophen (Tylenol, Vicodin, others, see Box) to less than 4000 mg per day. Livers vary in their tolerance of acetaminophen. If you *routinely* ingest ≥ 4000 mg/day, ask your doctor to check labs to see if you sensitive to it.

A huge overdose of acetaminophen may suddenly kill your liver. Just how high is huge varies with the individual, with some much less sensitive than others. Doses of 7.5 – 10 grams (20 regular strength Tylenol tablets) over a period of 8 hours or less can land people in the intensive care unit. Fatalities have occurred with less than 15 grams.

Acetaminophen overdoses cause 42% of all cases of sudden liver failure in the U.S. Fortunately all those patients with liver failure don't need liver transplantation. An effective therapy stops the drug-induced damage, if begun soon after acetaminophen ingestion.

A recent study[1] made waves with the finding that 40% of healthy people taking 4000 mg of acetaminophen daily developed a blood test abnormality indicating liver toxicity. The test, ALT, is considered to be significantly abnormal if the level is three times normal. Up to 80% of the 145 subjects developed *any* abnormality of ALT, small or large, in as little as three days.

Both plain acetaminophen and three combination drugs induced identical abnormalites. The results are concerning because 4000 mg per day is a standard dose that would not even raise an eyebrow in an emergency room.

To put the dose in perspective, **regular strength Tylenol comes in 325 mg tablets**. The maximum recommended adult dose, "2 tabs every 4-6 hours, maximum 12 tablets in 24 hours," delivers 3900 mg. Problems arise with **Extra Strength** formulations of 500 mg. They carry the same directions, "2 tabs every 4-6 hours," but the maximum dose is 8 tablets in 24 hours. People generally assume Tylenol is safe and take it as they would regular strength tablets. Twelve Extra Strength tablets deliver 6000 mg. A **Vicodin** tablet with 7.5 mg of narcotic contains 750 mg acetaminophen. People popping 2 tablets every 4 hours after surgery will ingest 9000 mg acetaminophen a day.

In previous, small studies, less than 10% of subjects experienced acetaminophen-induced ALT abnormalities. The recent study included many *continued on page 2*

MEDICATIONS CONTAINING ACETAMINOPHEN

any Tylenol product	any Contac product
Hydrocodone/APAP (the second number of the dose is acetaminophen, as in Vicodin 5/500)	
Vicodin (varies, 500 – 750 mg)	
Norco (325 mg)	
any Theraflu product	Benadryl Allergy & Cold
Midol Menstrual Complete	Vicks Dayquil or Nyquil
Sinutab Sinus	Exedrin Migraine
Sine-off	Sudaphed PE
Coricidin Cold & Flu	Comtrex
many generic or store-brand arthritis remedies	
many generic or store-brand cold/flu remedies	
Percocet	Ultracet

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more Hispanic Americans than did previous studies. They were twice as likely as non-Hispanics to end up with an abnormal ALT.

Abnormal ALT values occur commonly and can be affected by many factors. The National Health and Nutrition Examination Survey reports that the prevalence of elevated ALT in all men is 13.4%, in all women is 4.5% and in Hispanic Americans is 17.4%, possibly due to the higher prevalence of fatty liver in that population.

Fatty liver, prolonged fasting and chronic alcohol consumption almost always raise ALT levels. They predispose people to react more easily and dramatically to acetaminophen. In the JAMA study, 38% of people taking placebo had slightly high ALT levels.

No one suffered liver failure or lasting liver damage. Any person whose ALT rose stopped the study drug, after which ALT normalized. In some the abnormality persisted for two weeks, even after acetaminophen blood levels were undetectable.

Low level ALT elevations, if unaccompanied by symptoms of liver disease and transient, are probably clinically unimportant. McNeil Consumer, the makers of Tylenol, strongly refuted the study's significance. They assert that isolated ALT elevations, even up to 10 times normal, without other laboratory abnormalities, poorly predict long term liver injury. The kicker is the "without other laboratory abnormalities" part ─ By definition, if certain other lab tests are abnormal, there **is** liver injury.

If you are thinking of switching to the anti-inflammatories for pure pain control, consider that they may hurt the kidneys, cause bleeding, and/or contribute to heart disease. Narcotics mask pain and risk addiction. A variety of "neuroleptic" drugs, that work on nerves to alter pain perception, have their own set of side effects.

What's a body in pain to do? **Use medications judiciously, intermittently and in the lowest dose that takes the edge off and allows functioning**. Check with your doctor to see if it is OK to adjust the dosage. Learn to manage pain with massage, altered body mechanics and mental techniques to diminish the need for drugs.

[1] Watkins, et al. JAMA 2006;296:87-93.

Dr Gism

The body recognizes all the calories you eat, not just the ones on your "good days" or the ones you ate for breakfast.

INFLUENZA VACCINE

by Ann Gerhardt, MD www.drgsmedisense.com

Do get vaccinated this year. Manufacturers do not anticipate a vaccine shortage this year, so you don't have an excuse to avoid vaccination. The optimal time (in order for your body to have time to make protective antibodies) is before flu season starts, in October and November. They have passed, but vaccination **any time through the end of flu season (April)** helps.

Both the inactivated and live vaccines contain two new components to protect against new viruses. **None of the vaccine components protects against bird flu**.

Those **who should be vaccinated are... just about everyone**: children aged 6-59 months, their household contacts and out-of-home caregivers; pregnant women; persons 50 years old or older; any person with a chronic medical condition; healthcare workers. It would be easier to say that the only people who shouldn't be vaccinated are healthy, non-pregnant people between the ages of 5 and 50 who have contact only with healthy people.

Adverse effects: Any person with a significant egg allergy should avoid both types of vaccine. A painful, red, swollen arm at the injection site usually means you have persistent immunity, leftover from previous vaccines. The swelling is your immune system attacking the vaccine as if it were a real infection. This is a good thing. Fever, shortness of breath or a red area that continues to expand over days are not and you should call your doctor.

The inactivated vaccine contains a small amount of thimerosal, which contains mercury. Though no documented toxicity to children has resulted from thimerosal exposure, parents have the option of their child receiving Flumist which contains no mercury. Flumist is like a superhero who lost his powers - it might cause some sniffles and sore throat, but not florid flu.

Deadly Infection from Spinach: It's The Beef! *by Ann Gerhardt, MD* www.drgsmedisense.com

Bottom line at the top: The recent illnesses and deaths due to spinach consumption were caused by E. coli O157:H7. This bacteria has caused many outbreaks of illness associated with ground meat and a variety of other foods. It usually resides in animal, most commonly cow, manure. Foods become contaminated when they come in contact with manure. To prevent illness, wash your hands, thoroughly cook ground beef, wash fruits and vegetables under running water and consume only pasteurized dairy products.

Sources of information: The Centers for Disease Control (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm), the Food and Drug Administration (http://www.cfsan.fda.gov/~dms/spinacqa.html) and Maki DG. NEJM 2006;355:1952-1955.

A nationwide moratorium on fresh spinach consumption last September followed its connection to severe illness. Two hundred four people fell ill, 104 seriously enough to require hospitalization, due to an infection with a type of bacteria called E.Coli. Three people died.

E. coli normally lives in human and animal colons in large numbers. Run-of-the-mill E. coli serve a useful function in the body by suppressing the growth of harmful bacterial species and by synthesizing appreciable amounts of vitamins. The particular strain related to the current outbreak, O157:H7, produces a toxin that causes life-threatening disease. The toxin severely damages the lining of the intestine, causing bloody diarrhea. It may also cause life-threatening diseases called hemolytic uremic syndrome, which damages kidneys, and thrombotic thrombocytopenic purpura, which causes clotting in vital organs.

The Centers for Disease Control, which investigates all outbreaks of food-related disease, linked the infections to consumption of spinach processed by a packaging company in the Salinas Valley, where more than 75% of the nation's spinach is grown. Other E. coli O157:H7 outbreaks have resulted from contaminated Salinas Valley produce and the FDA and growers are working towards tighter standards to "develop a comprehensive plan which is designed to minimize the risk of another outbreak due to *E. coli* O157:H7 in spinach grown in central California." E. coli O157:H7 was isolated from thirteen spinach packages turned in by patients. The strains were identical to the strain causing disease. Eleven of them had lot numbers showing they were processed on a single day at the Natural Selection Food plant. FDA investigators found the same strain of E. coli that caused the infections in manure from one of the cattle ranches bordering the spinach field.

According to epidemiologist Dennis Maki, MD at the University of Wisconsin, *more than* 100,000 cases of infection and 80 deaths due to E. coli O157:H7 occur in the United States each year. Most of these are isolated cases, not associated with outbreaks. No one knows the true frequency, because E. coli O157:H7 probably causes a whole range of disease, from minor diarrhea in some, to the unmistakable symptoms of profuse, bloody colitis in the severe cases. Most mild cases would never come to the attention of medical professionals and be counted.

Undercooked or raw hamburger (ground beef) has caused ~75% of the documented E. coli O157:H7 outbreaks. The others have been traced to alfalfa and bean sprouts, lettuce, spinach (26 outbreaks since 1993), unpasteurized fruit juices and cider, dry-cured salami, game meat, cheese curds and raw milk. People also have acquired the bacteria from sewage-contaminated water, swimming holes, petting zoos and other people with diarrhea.

Where does all this E. coli come from and why is it so toxic? Epidemiologists have long recognized that various strains of toxin-producing E. coli cause the bulk of traveler's diarrhea. For those who haven't left the U.S., most toxic E. coli comes cows.

Cows' digestive systems evolved to handle grass, clover and other forage. They succeed in doing this by fermenting high fiber forage in the rumen, a part of their complex stomach system. Instead of range-fed cattle, virtually all beef currently sold in grocery stores comes from cows raised in CAFO's (Confined Animal Feeding Operations). After a short, pastoral youth spent grazing in a field, cows are shipped to industrial feedlots and fed corn. Tens of thousands of cattle, living in close quarters fostering disease spread, are fed inexpensive corn to bulk them up massively and quickly, so they can get to market.

The unnatural feeding system encourages proliferation of toxic bacteria. It is bacteria (normally a healthy kind) that ferment food at neutral pH in the cow's rumen. A diet of high starch, low fiber corn interferes with normal digestion by fostering non-native bacteria which produce less gas and more acid. An acidic rumen conditions the resident bacteria to resist acid.

Acid resistant bacteria present a danger to humans. We don't sterilize our food, drink, fingers or most other things that make their way into our mouths. Exposed to micro-organisms all day, we rely on the acid in our stomachs to kill most microbes as they pass through. An acid-resistant bacteria like E. coli O157:H7 passes through unscathed to our intestines and wreaks havoc.

Up to 3% of domestic cattle carry E. coli O157:H7 at the

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time of slaughter. E. coli from manure may end up on the animal's hide or udder. Bacteria present on the cow's udders or on equipment may get into raw milk. In a petting zoo, *E.coli* O157:H7 can contaminate the ground and hides. Meat can become contaminated during slaughter, and organisms can be accidentally mixed into meat when it is ground. Because the meat of many cattle is ground together to make ground meat, the possibility that at least some of that is meat is contaminated is much greater than with a single cut of meat from one animal. Hamburger should be cooked well to kill all the bacteria. The guy who overcooks your burger on the grill is actually doing you a favor.

CAFO feedlot cattle produce astronomical amounts of manure, at least some of which contains harmful bacteria. Farmers use manure for fertilizer, which may contaminate agricultural products like lettuce and spinach. Cows produce far more manure than farmers need for fertilizer, so the excess is dumped into huge lagoons. Periodic spills and run-off during heavy rains wash raw manure into streams, fields, lakes and wells. Hence, bacteria appear in foods considered to be the essence of health, like spinach and sprouts. It's amazing that more people don't fall ill every day.

No one knows how many E. coli O157:H7 it takes to produce an infection, but it may be as few as ten. That means you should be very careful. **Consumers can prevent E. coli O157:H7 infection by thoroughly cooking ground beef** and (in a restaurant) sending any under-cooked meat (along with the plate and bun) back to the chef to be replaced. Ground beef should be cooked until a thermometer inserted into several parts of the patty, including the thickest part, reads at least 160º F. **Always wash hands carefully** after having a bowel movement and before preparing or eating food. **Fruits and vegetables should be cooked or washed well under running water.** If you have diarrhea, do not swim in public pools or lakes or share baths with or prepare food for others. **Drink only treated municipal water or well water that has tested negative** for contamination**. Drink only pasteurized milk, juice and cider.** Avoid swallowing lake water when swimming. **Avoid spreading harmful bacteria in the kitchen by keeping raw meat separate from ready-to-eat foods. Wash anything that has touched raw meat**, such as hands, counters, utensils and plates, with hot soapy water before they are used to serve food. Re-wash the pre-washed, bagged leafy vegetables before serving, no matter how clean they look in the bag. It seems stupid to wash sprouts for a salad, because it makes them look soggy and stupid, but do it anyway. For more information about reducing your risk of food borne illness, visit the U.S. Department of Agriculture's Food Safety and Inspection Service website.

Think first, before you act: Because you are an extraordinary manifestation of a tangle of unique genetic material, think first, before applying any or all of these articles' information to your life choices. Dr G's just trying to interpret medical and nutrition news reports for you - within the framework of information already known and the limitations of how the studies were done. Articles this size can't possibly contain every bit of information that was ever published on a subject. Distillation may leave some things out: Hopefully not crucial
pieces. Don't crucify me if some new tidbit of information comes along that contradicts what I wrote. This newsletter offers some insight, not The Cure: It's not a doctor's prescription. PLEASE discuss any changes in therapy or lifestyle with your doctor. Subscribing to this newsletter presumes that you accept your own risk when making decisions about your health.

How to get through the holidays without gaining weight:

Exercise at least 5 days per week. Don't let anything keep you from doing it – Not weather, relatives, being busy or the fact that your food intake is atrocious.

Taste everything you want to eat, so you don't feel deprived.

Don't eat full portions of anything except non-starchy vegetables.

GETTING THE MOST OUT OF YOUR DOCTOR: Make sure you understand and verbalize the plan. *by Ann Gerhardt MD*

Complaints from both my sister and father about inadequate communication from their doctors got me thinking... True communication implies understanding. After the doctor or nurse announces a diagnosis, describes a course of action and prescribes treatment, REPEAT OUT LOUD your understanding of what you heard.

Don't worry about taking extra time: If you are concise you will save time in the end by preventing confusion. Doctors, even ones who think they use lay person language, speak medical-ese that many people don't understand. Don't hold it against them – they've forgotten that prior to medical school they didn't know the meaning of medical terms that now have intuitive meaning to them.

Even when the language is understandable, sometimes the brain gets stuck on one word. Cancer is one of those words. After hearing that word, most people don't hear much else. Say, "Please write down the diagnosis and plan. My mind went numb and I'm not able to understand much now."

Generally each visit should produce -
1) a diagnosis or testing to elucidate a diagnosis
2) treatment, including details about timing and duration
3) possible adverse effects of tests and treatment
4) contingencies for success or failure of the treatment.
You should understand each.

Example: The cardiologist tells you that you have aortic stenosis, you need a cardiac cath and the only definitive treatment is surgery. IF you understand those words, you say, "One of my heart valves is too small and tight and I need to have a catheterization to see why and to see if I'm a good surgical candidate." You might ask when the cath is, how you are to keep from passing out in the meantime and what the risks of surgery are. Ask the specifics of what to expect with a catheterization, just to preclude misunderstanding and irritation with the doctor.

If you don't understand the words, don't fake it. Don't go home and tell your wife that everything's fine but you have to do a little test next Thursday. Ask what aortic, stenosis, and cardiac cath are. Then ask a slew of questions, like how did this happen, the risks of catheterization, when you will see the doctor again, if any medications should change and what symptoms should lead to a call to the doctor.

Another example: The doctor says you have a cold, probably a virus, and you should take Tylenol for fever and Sudafed for congestion, drink fluids and rest. You should say, "You think I have a virus. I'm supposed to take Tylenol if I have a fever (by the way, what temperature is a fever?), and Sudafed according to the package label. If you think I only have a virus, you must think I can go back to work tomorrow. I thought, since it had gone into my chest, that I need an antibiotic – If I had known I wouldn't get one, I wouldn't have come in. What if I get worse?" That should lead to an explanation of cut-off level for fever, why antibiotics are not used for viruses, how long you are contagious and the contingency plan if nothing improves.

You could have said, "I feel like death and you think I should go home with Tylenol??? How much more dead should I be before I get some real treatment???" Don't say that. Sarcasm doesn't yield much unless you say it with a smile and your doctor has a sense of humor, an intact ego and a good mood that day. The odds of all four on a given day are small.

Personality types play into this: People who want to stay in denial listen to the diagnosis and plan, then go home to tell the kids that the doctor says she's "fine." Most times she's not lying, because that's what she thinks she heard. If she said, "So you think I'm fine and I don't need to do anything," she might have another chance to hear, "You have high blood pressure and astronomically elevated cholesterol. You need to lose 50 pounds, exercise and take this medication. Then see me in three months to re-check."

Hypochondrias and anxious people *over*-hear what they believe are death knells. The doctor says, "You have an enlarged lymph node that is probably due to your skin infection. If it is still enlarged in two months, we can biopsy it. Don't keep rubbing it, since that will keep it irritated and enlarged." You hear, "I have cancer of the lymph system that started because of a skin infection. You can't biopsy it for two months, and don't want me to rub it because that will make the cancer spread." (*I kid you not: People really do misinterpret in this way.*)

You need to say what you think you heard as well as what you fear you heard. If you don't, it will gnaw at you, make your life miserable and hurt your relationship with your Dr.

A Disc vs. Bone Density Conundrum

by Ann Gerhardt, MD www.drgsmedisense.com

Reader's question: *About 6 - 8 years ago, I had my first DEXA bone density scan. The result was 130% of normal. The bone density was still high two years ago. Recently when I went to ER for a spell of weakness, I was told that the x-ray of my cervical (neck) spine had degenerative disc disease. Why high density in one area of my bone structure & degenerative discs in another? Judy*

The short answer: Vertebral discs are not bone and whether they degenerate or not has nothing to do with bone density.

The long answer: The spine is a column of bones called vertebra. They are separated by discs. **Discs are NOT bone**. They are a type of cartilage. Discs don't even show up on x-ray, because they contain no calcium. They are similar to flat jelly beans that keep vertebrae from slamming into each other.

A DEXA scan measures bone density in the bone of the lumbar spine (the vertebra just above and below the waist). Judy thinks that there is a difference of strength and integrity of her cervical and lumbar spine. We can't conclude that from her tests, though. **A bone density test measures the concentration of calcium in the vertebra, while an x-ray report that mentions discs derives that information from the space between vertebrae.**

The integrity of discs starts to fail as we age (over 35 years). As they weaken, the weight of the spine squashes them flat. Sometimes the disc ruptures as it weakens, and other times it stays intact, but spreads and pushes on the spinal cord.

Just having a squashed disc does not mean that it will cause pain you might have. **At least half of middle age people have degenerate discs. Most of those people have absolutely no symptoms.**

The question she didn't ask is, "Does my high bone density necessarily mean that my bones are strong?" She may indeed have very calcium-dense vertebral bodies. BUT, the **DEXA scan doesn't tell us how the calcium is arranged in and on the bone.** It measures calcium both inside and on the edges of the vertebral body. Healthy, strong vertebrae have a good amount of calcium throughout, not just on the edges.

As we age, micro-trauma (or big-time injuries) irritate the outside edges of vertebra and pull on their ligamentous connections. Scar tissue containing calcium heals the damage. (A very old person's enlarged knuckles are another example.) Over time the edges of damaged vertebra heavily calcify, forming what is called spurs, independent of what is happening to the vertebral body's inside. The DEXA scan gives an average bone density for each vertebra, lumping the middle, spurs and edges together.

Possible DEXA results: (inside means within the vertebral body, not including spurs and arthritic edges)

Very dense bone inside, with or without spurs:	**High**
Normal bone inside, calcified spurs and edges:	**High**
Normal bone inside, no spur calcium:	**Normal**
Low inside calcium, calcified spurs and edges:	**Normal**
Low inside calcium, no spur calcium:	**Low**

Further gradations of calcification inside and on the edges/spurs modify the DEXA result along the above continuum.

Disc degeneration and bone calcification are unrelated processes. So the answer to the question is that her **bone** is dense, but her **discs** are thin. It is perfectly reasonable for one person to have both.

MANGOSTEEN MANIA

by Ann Gerhardt, MD www.drgsmedisense.com

Bottom Line At The Top: If there were definitive answers about Garcinia mangostana (mangosteen) and health, this would be a short article. It's not. Naturally occurring chemicals in the rind and bark of mangosteen kill a variety of microorganisms and cancer cells on contact in test tubes. Promoters of mangosteen juice promise cures for what ails you. The benefit and safety of the internally ingested juice is unknown.

Folk medicine practitioners powder the dried rind of Garcinia mangostana fruit for administration to people with dysentery, diarrhea, cystitis, gonorrhea and thrush. They also incorporate the powder into an ointment used to treat skin ailments. Filipinos and Malaysians use a broth created by boiling the leaves and bark for the same types of illnesses and a root extract to regulate women's periods.

Entrepreneurs have jumped on mangosteen, creating multi-level marketing schemes to distribute mangosteen juice. They claim it cures over 200 maladies - everything from stroke to depression to cancer. Googling mangosteen yields over 1.8 million results, most heralding the wonders of juice products like Xango, Thai-Go and MangoXan. A Georgia family practitioner wrote a book about mangosteen and purports to do research, but really just reviews the 50 or so studies of bark and rind extract that have been done in other people's laboratories. True to most hyped up remedies, mangosteen fruit has some potential benefit, but it's not clear that the medicinal parts of the fruit are in the marketed juice or how much they help or harm.

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Garcinia mangostana (mangosteen) is a tropical evergreen tree. It has no relation to the mango. The tree grows 20-75 feet tall and takes fifteen years to start producing only a few fruits each year. The tree dies after even a single exposure to temperature less than 40 degrees. Only one tree has ever been cultivated in the continental U.S., and it bore a single fruit and then died. Its finicky growth requirements and low yield deter mass cultivation.

The U.S. prohibits importation of the whole fruit without fumigation or irradiation, so it is generally not available. Oriental markets sell the canned, frozen or juiced pulp and millions of multi-level marketers sell a juice supplement that contains who-knows-what.

The outer shell (hull, rind, or peri-carp) is hard and contains anti-insect, anti-bacterial, anti-viral, anti-oxidant and anti-fungus substances. How smart of the plant to evolve toxins that discourage biological destroyers! Thousands of other plants contain similar substances.

Scientists have isolated naturally occurring chemicals, *xanthones,* that some think are responsible for mangosteen's anti-microbial effect. They have identified 23 different xanthones from mangosteen rind, seed, root and bark, *but not from the juice*. Some, but not all, of the xanthones kill bacteria, viruses and fungus on contact in test tube experiments. In lab cultures, they even work well against two of the most virulent hospital bacteria, VRE and MRSA.

A few xanthones are toxic on contact, killing a variety of cancer cells, including breast, colon, lung, mouth and stomach in laboratory test tubes. Each cancer cell sort of blows up in a mini-explosion, by a process called apoptosis.

In test tubes xanthones inhibit enzymes (COX) that contribute to inflammation and act as anti-oxidants. Distributors of mangosteen juice claim that it has the highest ORAC value (Oxygen Radical Absorbance Capacity) of any plant, an absurd claim since all plants have not been analyzed.

Even if true, it may not be a good thing ─ High doses of strong anti-oxidants can't be stored and become pro-oxidants in biological systems, a dangerous state proven for at least one of mangosteen's xanthones.

Inside the fruit is a very sweet, fleshy pulp and up to 5 seeds. The juice tastes great (South East Asians call it the "Queen of Fruits") but has no greater health benefit than less exotic fruit juices. **Neither folk medicine docs nor scientists have found a medicinal use for the juice.**

Therein lies the rub with mangosteen juices: No where, on any mangosteen website, does it say how much biologically active rind, bark or xanthones are in the juice. They do say they put some in, but there is no documentation that the amount present in the juice even comes close to the amount used in folk medicine powders and ointments. How much can it contain, after all, since it's a *juice*, not at mush, ointment or powder?

I've had patients who used mangosteen juice, often at the behest of relatives who were distributors. Each had chronic, waxing and waning symptoms of incurable diseases. Most believed at first that the juice helped, but eventually stopped it when they realized that the frequency, duration and intensity of their bad spells hadn't really changed.

Folk medicine docs use mangosteen's powdered bark or rind for problems amenable to treatment that makes direct contact with the problem – like thrush (tongue), dysentery (the lining of the bowel) or eczema (skin). There is no evidence, even in scientific experiments, that xanthones are absorbed across the intestinal lining into the human body, so that they might cure non-contact maladies.

Anti-microbial compounds in mangosteen rind act like bleach or antiseptic soap: They kill on contact in nature and in the test tube. Antiseptics like bleach and Betadine also work locally, without absorption into the body. Bleach kills almost every organism on contact, but will drinking bleach help a cold? No. Such direct toxicity helps only with infections in which the antiseptic can be directly applied to the culprit organism without hurting normal tissue (much).

Is there any evidence that the currently hyped mangosteen juice is harmful? No, but no human studies have been done to determine safety. For that matter, there are no published human trials of any kind, including ones that demonstrate efficacy. XanGo (the market leader) certainly isn't going to advertise side effects. As a nutritional supplement, it isn't regulated by the government. I found one notation that one derivative of mangosteen's xanthones raises blood pressure and dulls mental function. The major harm, at least given current information, would be that a person foregoes a proven beneficial treatment in favor of fruit juice faith.

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Another major concern is that **any substance that can kill cancer cells and bacteria on contact in a test tube may just as well kill healthy cells**. One fifth of all cancer chemotherapy treatments, including vincristine, Taxol, vinblastine and etoposide, were derived from plant sources. Each of these natural chemicals kills cancer cells, but clinically beneficial doses cause toxicity because innocent bystander normal cells die also.

Mangosteen doesn't have a corner on the xanthone market. Xanthones from bark and roots of other trees also kill tumor cells and microbes in laboratory experiments. You won't find them on supermarkets shelves, however. Only G. mangostana has entrepreneurs to market it, with claims like "mangosteen is now on an unstoppable march to conquer the world" and "See what it can do for your well-being, your finances and your dreams!"

Mangosteen distributors inflate health claims, saying there is a "wealth of independent scientific studies already done on Mangosteen... their printouts of research papers stacked up to over a foot and a half!" First, in the world of science, that's about enough to generate some interest, not definitive answers. Second, the touted research dealt with xanthones extracted with methanol and hexane, not mangosteen juice product. **We don't even know if the benefits of mangosteen seen in folk medicine are due to xanthones or to some other, as yet unidentified component**.

The first xanthone was isolated from Garcinia mangostana in 1855. Over 150 years later, only a handful of labs, most in the Orient, actively study mangosteen's xanthones and their biological activity. There are many studies of natural medicine products that have yet to be done. Unfortunately, companies have little motivation to put money into studying naturally occurring chemicals because such substances are un-patentable: No patent, no money.

Hopefully some future do-gooder will fill this information vacuum: **Any of the plant's xanthones may ultimately find a role as a useful and safe medication.** At the very least, maybe we'll find out if mangosteen-maniac juice has any real health benefit.

You may decide to spend $39.99 for 25 ounces of fruit juice that may or may not help or harm. Now you know enough facts to really confuse your decision.