

Methylcobalamin for SMA?

In our last issue, we introduced you to **Methylcobalamin**, the neurologically-active coenzyme form of vitamin B₁₂ (see “Methylcobalamin: Armor for Your Nervous System!” in *The Holistic Lifestyle* 1[6]). **Methylcobalamin** is essential to maintaining the healthy structure and function of the nervous system. Already, trials have suggested that **supplementing with high doses of Methylcobalamin can protect the brain and nerves against toxins, and help the body to restore the health of damaged nerves** in such neurological disorders as Multiple Sclerosis (MS), Bell’s Palsy, diabetic neuropathy, Lou Gehrig’s disease (ALS), Alzheimer’s disease, and glaucoma. Since that article was published, a new study has suggested that **Spinal Muscular Atrophy (SMA)** may soon be added to the list.

Though you may not have heard of it, SMA is actually the most common genetic cause of infant death.¹ SMA is caused by the lack of one of the two genes that help make **survival motor neuron (SMN)**. SMN, in turn, is a “chaperone” molecule, which makes sure that the proteins made by the cell are folded into the right shape to do their job. SMA is a chaperone involved in shaping the “machines” that the body uses to make **messenger RNA (mRNA)**. The cell uses mRNA to carry out the instructions on the DNA code. Without enough functional SMA, mRNA is not produced in adequate amounts; and with only low levels of mRNA, SMA sufferers’ nerve cells don’t work well, and one particular kind of nerve cell (**anterior horn cells**, which are located in the spinal cord) can’t carry signals to the muscles effectively. Without these signals, the muscles slowly atrophy, leading to muscle weakness and wasting – and sometimes paralysis – in those who survive infancy.

So where does **Methylcobalamin** fit into the picture? In order to for SMN to act on proteins, it has to grab ahold of the amino acid arginine. But scientists looking into the way that this binding works have discovered that **SMN can’t effectively latch onto the**

arginine in proteins unless that arginine has been “methylated” ... a task which ultimately requires Methylcobalamin.² And in fact, *other* proteins, which interact with SMN, *also* do their job best when they’ve been methylated.

The scientists who made this key discovery are guessing that a lack of **Methylcobalamin**, and substances which require **Methylcobalamin**, may make a bad situation worse. People with SMA have too little SMN *to begin with*, and a lack of functioning **Methylcobalamin** would prevent that small supply of SMN from doing what it can. The situation would be a little like having half of the staff at an office call in sick on the same day that the computer network was acting up. As Dr. Gideon Dreyfuss, head of the University of Pennsylvania research team that made the new discovery, puts it, “The thought is that SMA patients, who are already compromised in their levels of SMN, might be more severely affected if they are also suboptimal in their levels of protein methylation.”³

The researchers are now trying to set up clinical trials, using regular vitamin B₁₂ (along with folic acid, which the body needs to make its own **Methylcobalamin**), to see if optimizing protein methylation can help SMN to perform its function – and thereby improves SMA victims’ lives.

The University of Pennsylvania team have also suggested there may be a connection between inadequate protein methylation and **multiple sclerosis (MS)**. If they’re right, it would be a key to understanding some of the biochemistry behind the results seen in using **Methylcobalamin** in this disease. The neurological damage seen in MS is caused by

the victim’s immune system attacking the **myelin sheath** that insulates the nerves. But *why* does this attack happen?

It turns out that the problem may be with abnormalities in the very structure of MS sufferers’ myelin – and, specifically, of the key protein component, **myelin basic protein (MBP)**. The MBP produced by MS sufferers appears to be more likely to contain the amino acid **citrulline**, at a location which – in mature, healthy myelin – is instead occupied by arginine.⁴ Immune cells from both healthy people and MS victims will attack such myelin as “foreign,”⁵ and other factors about “citrullinated” myelin may also make it more likely to degrade.⁶

Crucially, there is an enzyme in the body which can degrade arginines in myelin into citrulline. Yet the enzyme is no more active in MS patients than it is in healthy people.⁴ So why is so much more of their MBP’s arginine degraded to citrulline?

A recent report may provide the answer. **The methylation of the arginine in myelin basic protein makes it much more resistant to being degraded into citrulline.**⁷ Again, the methylation of proteins requires **Methylcobalamin** – and MS sufferers don’t properly metabolize vitamin B₁₂,⁸⁻¹⁰ and their nerve function improves when they’re given **Methylcobalamin** supplements.⁹ So a new possibility is coming to light: **might a lack of Methylcobalamin lead to inadequate methylation of the arginine in MBP, making it more likely to be degraded into citrulline – and therefore to be attacked and destroyed by the body’s immune system?**



In addition to any effect on protein methylation, the research on **Methylcobalamin** shows that this coenzyme has the ability to directly protect and regenerate nerves. The editorial team at *The Holistic Lifestyle* has tried to contact Dr. Dreyfuss to suggest the possibility of using **Methylcobalamin itself** in any new research, rather than folic acid and regular B₁₂, but he was on a family vacation at presstime, and we have yet to hear back. If we get positive news, we'll let you know.

What can SMA sufferers and their loved ones do in the meantime? That's up to each individual and his or her doctor. But as neurologist Dr. Kenneth Fischbeck of the National Institutes of health says, "Any kind of glimmer of hope is well worth pursuing. You have to make a jump to say you'll find a deficiency in people. On the other hand, it is a benign treatment."¹¹

Our thanks to Dr. Michael Hockridge of StoneChurch Chiropractic Centre for alerting us to this story.

Spicy Soup Fights Cancer?

Chicken soup is a food many of us remember fondly from our childhood as the food Mom used to express her love and nurse us when we were sick and miserable. It's hot and brothy on a crummy winter's night; it's a food that we associate with nurturing, with healing ... with hearth and home. Many of us still crave chicken soup as grownups for its "comfort-food" associations. The title of the popular feel-good story collection, *Chicken Soup for the Soul*, draws on just these kinds of emotional meanings.

Some interesting new research suggests that the Thais may have something a little like "chicken soup for cancer."

Stomach cancer was, until recently, the most common cancer on Earth – and it's still the second most common cause of cancer death worldwide. But while stomach cancer rates have been going down in the West for years, it's continued to be a major plague in many Asian countries: in 1995, 75% of all of the stomach cancer diagnoses in the world were made in Asia.¹²

Ironically, Japan, a country well-known for the overall health and longevity of its population, still suffers a very high stomach cancer rate. By contrast, Thailand is an exception to the Asian trend, having an unusually **low** rate of stomach cancer.⁵ Five

years ago, an international group of Japanese and Thai scientists teamed up to see if they could track down some of the dietary factors that might be responsible for this discrepancy.

The researchers began by testing extracts from 112 plants commonly consumed in the diet in the two countries, looking for foods that might be protecting the Thai people from cancer. They tested the plant extracts in test-tube models of one of the three key steps in the development of a cancer. Interestingly, about 60% of the Thai plant foods inhibited this step in the cancer process, but only 26% of the typical Japanese plant foods did.¹³ And when the researchers narrowed their list down to spices and "medicinal" foods, the proportion jumped to fully three-quarters of the Thai plants.¹⁴

The team has since proceeded to focus on some of the most promising of these compounds. One of the three most powerful spices tested is **galangal ("Thai ginger")**^{7,15} which is used widely in Thai cuisine. In particular, it's a key ingredient in **Tom Yum Gung**, a hot-and-sour, brothy seafood soup that's as much a part of popular culture in Thailand as chicken soup is in North America. Even more interestingly, another line of research led the same group to the discovery that **another** spice in Tom Yum Gung (**Kaffir lime**) strongly inhibits the production of substances involved in creating inflammation by immune cells.¹⁶ It's thought that **excessive** production these substances by immune cells in the stomach may play a role in the increased risk for stomach cancer in people infected with *H. pylori*, the bacteria that causes most ulcers.¹⁷

All this suggests that the popularity of **Tom Yum Gung, rich in these two potential cancer-fighters, may be part of the reason why the Thai people have so little stomach cancer.** While there's no reason to believe that eating Tom Yum Gung would help to **treat** stomach cancer, the spices in the soup may prevent cancer from getting started in the first place. If you already enjoy Tom Yum, you now have all the more reason to relish it ... and if you've

never sampled the exotic, zesty broth, you may want to give it a try.

If you'd like to try whipping up a batch of Tom Yum yourself, you might try the recipe in the sidebar. It's easy to make, and – if you can take the heat – absolutely delicious. You probably won't find many of the spices at your regular grocery store, but they should be easy to locate at Asian specialty markets. On the other hand, your usual supermarket may carry pre-made Tom Yum Gung spice mixes, which may be a preferred choice if you lead a hectic lifestyle.



It's important to note, however, that **many of these "Tom Yum Gung" preparations don't actually contain the key spices thought to provide the soup with an anti-cancer punch, so you'll want to look for galangal and**

Kaffir lime on the label. You'll also want to consider how much **sodium** these products contain: there's enough salt in some Tom Yum Gung mixes to drive your blood pressure up just by looking at the label!

Cover Up – And Eat Right

As the Earth's protective ozone layer continues to thin, people all over the world – but especially those of us living in countries at extreme latitudes, like Canada (in the north) and Chile (in the south) – are being bombarded by more **ultraviolet (UV) radiation** every year. While the light of the sun may **feel** like it's gentle on your skin, the energy that UV radiation provides is so intense that it can actually tear some molecules apart, forming **free radicals** and other types of "reactive oxygen species" (such as **singlet oxygen**).

It's the creation of these free radicals that causes sunburn, and that makes exposure to UV a big risk factor for **skin cancer, macular degeneration, and cataracts.** And it's the ability to neutralize these free radicals that gives **antioxidants** – from the lutein in spinach that concentrates in the macula of your eye, to the PABA in your sunscreen – their protective powers against these diseases.

You've also probably heard that too much UV can cause your skin to "age" early, forming unsightly wrinkles (a process sometimes called **photoaging**). Cigarette smoke causes the same problem: free radicals damage the **collagen** in your skin the same way that they tear into your DNA.

The best defense against photoaging – not to mention skin cancer, cataracts, and macular degeneration – is to shield yourself from the sun with sunscreens, protective clothing, and sunglasses with 99-100% UV protection. But if free radicals *cause* your skin to wrinkle up early, then might antioxidants (which fight free radicals) *protect against* photoaging?

To get an answer to that kind of question, you'd look into the connections between antioxidants in the diet (on the one hand) and skin wrinkling at the sites on the body which get the most sun exposure (on the other). And to get a really *complete* answer, you'd have to look to see if the protective effects of antioxidants still hold in people whether they tend to be exposed to more or less damaging solar radiation, and whether their skin is fair and easily-damaged or darker and more burn-resistant.

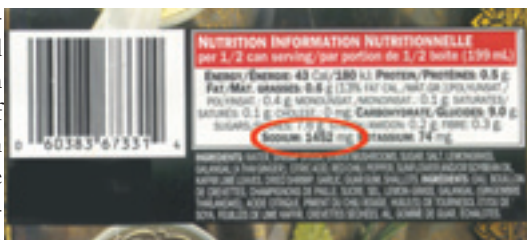
A group of scientists at Monash University in Melbourne, Australia did just that.¹⁸ The team collected some extreme close-ups of skin from four groups of older people: people living in sunny Greece and Australia who were genetically either of darker-skinned Greeks or of paler Anglo-Keltic stock, and naturally pasty-fleshed Nordic people living in Sweden's almost year-long gloom. Not surprisingly, the pale, sun-starved Swedes were the least photoaged, followed by the Greeks (who get lots of sun, but have protectively swarthy skin), while the sun-exposed, pale Anglo-Kelts of Australia had the worst wrinkling of the lot.

Next, the scientists looked at what the study subjects ate, looking to see if there were any protective elements in the diet. As they'd guessed, there were. In fact, across all the study populations, nearly a *third* of the variance in sun-induced wrinkling was accounted for by six out of the ten major food types. And in fact, **fully a fifth all skin aging could be accounted for by the apparent protective effects of a diet rich in vegetables, legumes, and olive oil**; by contrast, a high intake of meat and dairy had only a minor (and negative) effect (explaining less than one-twentieth of the variance).

Even more remarkably, when the researchers focussed in on the most vulnerable group – the pale-skinned, sun-exposed Anglo-Keltic Australians – they found that **a third of all differences in photoaging could be predicted by looking at a person's intake of just three foods: prunes, apples, and tea**. Why these foods rather than others? Part of the reason is likely to be that they're rich in brightly-colored, antioxidant **flavonoids**

such as **quercetin** (which is found in tea and apples alike), **catechins** (like the **epigallocatechin gallate** (EgCG) in tea), and the **anthocyanins** in the skins of plums (and thus, of prunes) which give them their rich reds and purples.

But why these *specific* foods, rather than other antioxidant-rich delicacies? It's a good guess that the fact that these are *common* foods in the diet, which an Australian might very well consume nearly every day of his or her life, also factors into the story. Outside of supplements, few Australians would get a daily dose of curcuminoids (from turmeric) or hawthorne berry – while in other parts of the world, these same foods might be providing the antioxidants which play the biggest part in protecting the skin from the harsh caress of the sun. In other words, tea, prunes, and apples might be local variations on a more global theme: that an antioxidant-rich diet is a key way to hang onto your youthful glow. But you knew that already, didn't you?



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The Holistic Kitchen
Tom Yum Gung Soup

You will need

- 750mL (3C) water or light chicken broth/stock
- 250 g (8 oz) shrimp/prawns, shelled and divided
- 2 garlic cloves, minced
- 5 leaves Kaffir lime
- 3 slices fresh or dried galangal
- 65 mL (1/4 C) fish sauce (nam pla)
- 2 stalks (lower third only) lemongrass (citronella), cut into 1-inch lengths
- 5 hot green chillis
- 125 mL (1/2 C) sliced straw mushrooms
- 65 mL (1/4 C) lime juice
- 90 mL (3/8 C) chopped shallots or green onions
- 1 T roasted chilli paste (nam phrik pao)
- 1 T chopped cilantro

Directions

In a serving bowl, mix the lime juice and chilli paste. Set aside. In a stock pot, bring chicken broth to a boil over medium heat. Add garlic, Kaffir lime, galangal, fish sauce, lemongrass, and shallots, mushrooms, and chillis. Simmer 2 minutes. Add shrimp and reheat to boiling. Cook until the shrimps are pink and firm (1 minute maximum). Pour the soup into the serving bowl, stir, and garnish with cilantro. Serves three.

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Trouble in what area??



Funny Thing.

It used to be that most people buying Maca were **women**, because Peruvian tradition has it that Maca is helpful for the symptoms of menopause. But when scientists looked into how the stuff worked, they found evidence to suggest that Maca isn't a "women's herb," but a **sex hormone herb**, affecting the way a mammal's "master gland" (hypothalamus) regulates sex hormones through the pituitary.

So the herb could have one effect in women ... and a very different effect in men.

While there aren't yet any controlled trials, studies on animal sexual behavior seem pretty clear. Maca supports male sexual function. You can't ask a lab animal if he's having fun ... but you can sure tell when he's having a hard time.