This article is the second of two papers on adaptogenic herbs in dogs. The first is on working dogs.

Adaptogens and the Senior Dog:
on optimizing health and longevity

by Dr. Christine King

It's been said that old age is not a disease. I wholeheartedly agree; it's a completely normal stage of life. It's also been said that old age is not for sissies. Although it makes me smile, I must protest a bit at that one, because it's founded on the assumption that everything breaks down or wears out as we age, and that is simply not true. At least, it's not universally true. It may be a *common* experience, but it is not a *normal* one. We are not designed to break down and spend our senior years struggling under the weight of chronic disease.

There is a normal cellular process that goes on in our bodies billions of times every day and which serves as a useful metaphor for healthy aging. It's called apoptosis ("*ae*-pop-*toe*-sis"), or programmed cell death. Apoptosis is a quiet, orderly process which occurs at the end of a cell's lifespan. There's no muss, no fuss; just cellular decline, death, disassembly, and orderly removal of "the remains," along with replacement by a fresh, new cell. That's how healthy aging should go, too: a quiet, orderly fade to black at the end of our lifespan.

So, why is chronic disease and premature death such a common experience with age? And can we do anything about it?

The Aging Process

Just as the aging body as a whole slows down in its movements, at the microscopic level aging represents the slowing down of cellular processes, a clogging of some of the pathways of normal metabolism, maintenance, and repair. The body is inherently designed to be self-maintaining and self-repairing, and in this way it's supposed to last us a lifetime. Disease occurs when one or more of those processes is overwhelmed or is defective or interfered with in some way.

Causes

Specific causes abound, but other than the old catch-all "genetics," the three most common primary causes are these:

- lack of replacement materials (i.e. an unhealthy diet)

- contamination by substances that hinder the process (i.e. pollutants from the environment or improperly eliminated byproducts from the body itself)
- chronic stress (i.e. an unhealthy lifestyle)

Chronic diseases, particularly degenerative diseases, are increasingly common with increasing age. In my opinion, that's largely because the effects of the unhealthy components of our diets, environments, and lifestyles accumulate and progressively gum up the works. The longer a pathway remains disturbed, the more trouble ensues. While the healthy young body has a great deal of reserve capacity, that reserve gets used up as we age, at a rate determined by heredity, diet, location, lifestyle, and other individual factors.

Consequences

Pathways of energy production are affected, so the aging body lacks the vitality and verve it once had. Pathways of cell replacement (an essential component of self-maintenance) are affected, so tissues comprise more older, defective cells than when the body was younger and healthier, and their capacity and perhaps also their mass is reduced. Hence the common functional disorders of old age, such as loss of hearing, failing eyesight, a decline in heart health, loss of muscle mass and strength, a decline in mental functions, and so on. Pathways of defense and repair are affected, so the body is more prone to infections and is slower to recover after an illness or injury. Furthermore, mutations which occur during cell replication increase in frequency and are not addressed as vigorously when the immune system is less potent. So, while cancer does occur even in the very young, it becomes increasingly common with increasing age.

Cancer is perhaps the ultimate in chronic degenerative diseases, as it involves a fundamental and usually permanent change in the way the cell behaves. In other words, cancer changes the programming of the cell type involved. That's not to say that cancer is permanent, but rather that the organizational change in the particular cell line appears to be irreversible, at least in our present understanding. (The medical research field of epigenetics is causing us to rethink a lot of our concepts about cancer, including the irreversible nature of the changes to these cells.) Whether the mutation is a simple mistake or a deliberate attempt to find a way around a chronic blockage in a particular pathway is not important here. The fact is that cancer represents a profound disruption in the body's ability to self-maintain and self-repair. Whether cancer constitutes a cause or an effect, it can end a life well before its time.

Adaptogens and the Aging Body

Adaptogens can provide some very useful tools to the aging body, whether that body is basically healthy or is dealing with chronic disease. As I discussed in the companion article on adaptogens and the working dog, adaptogen is the term used for a substance (most often a herb) that helps the body adapt to various

stresses and increase its resistance to physical and psychological factors that might cause damage. These herbs include the ginsengs (Asian and American ginsengs, Siberian ginseng), and several less well known plants (see Table 1). Interestingly, the ginsengs in particular have a long and venerable history of use as tonics for the elderly, taken to improve vitality and enhance longevity.

Although the individual adaptogens each have their own unique set of properties, or "signatures," a feature they all share is the ability to help normalize the various functions of a disordered system. Regardless of whether the particular disorder represents excessive (hyper-) or inadequate (hypo-) functioning, the adaptogens help the body return to a state of balance, to the normal functions, capacity, and responsiveness of a healthy system. In other words, they help restore the body's ability to *self-regulate.*

Not surprisingly, the systems most benefited are those with central roles in autoregulation: the central nervous system, cardiovascular system, endocrine and immune systems, and digestive system. Table 2 summarizes some specific properties of several different adaptogens, based on the findings of numerous scientific studies. (The article on working dogs discusses the effects of these herbs in relation to exercise capacity and mental acuity.)

When it comes to tissue damage, the adaptogens are both protective and regenerative. For example, in the central nervous system several of the adaptogens have noted neuroprotective and neuroregenerative effects, protecting the brain and spinal cord from various types of damage (e.g. toxins, lack of oxygen or nutrient supply) and facilitating repair if damage has occurred. Likewise they are cardioprotective and cardioregenerative, protecting the heart and blood vessels from damage and helping to preserve function and aid repair when damage does occur.

With functional disorders such as those involving the endocrine (hormonal) or immune system, the adaptogens help regulate the functions overseen by the disordered tissue or performed by that part of the immune system. For example, several of the adaptogens help normalize blood glucose and insulin, which can be very useful in patients with diabetes. And virtually all of the adaptogens help manage the functions of a disordered immune system, calming things down in overactive conditions such as allergy and stimulating the production and potency of white blood cells or antibodies in conditions of immunodeficiency or suppression.

How they work

Whenever I come across such broad medicinal claims for any product, I'm skeptical. Such a wide range of effects seems beyond belief and sounds suspiciously like "snake oil." But with the adaptogens there is an interesting and very fundamental mechanism of action that is well documented in scientific studies and goes a long way toward explaining this broad range of effects. It's the role of "molecular chaperone." These plant substances appear able to guide the synthesis and even the repair of proteins

within a cell, ensuring that the various amino acids are correctly ordered and the finished proteins are shaped and oriented for optimal function. This process is especially important during cell replication, when one cell divides into two.

This action is probably how the adaptogens are able to have beneficial effects on several different organ systems, as every living cell manufactures proteins for its own use and as signaling molecules for communication with other cells and organ systems. Recent studies of the adaptogens as molecular chaperones support the premise that these plant substances facilitate healthy cell functioning, improve resistance to the harmful cellular effects of stress (which include defective functions, abnormal signaling, and premature aging and death), and thus preserve longevity by preventing premature cell death. These and other studies also point to anti-cancer effects, including a reduction in the rate of metastasis (spreading of the cancer to other sites) and an increase in both the rate and length of survival.

Other mechanisms by which adaptogens can support an aging body involve three processes that are implicated in the aging process:

- chronic stress (physical, psychological, or both)
- chronic oxidative damage (cell damage by unregulated oxidation)
- chronic inflammation

The adaptogens help the body cope with stress in the short-term and adapt (become less vulnerable) in the long-term. They also have both antioxidant and anti-inflammatory properties.

Quality of life

"We none of us get out of this alive" is another of my favorite sayings. It's true; we've all gotta go sometime. But it's the manner of living that interests me more than the matter of dying. For me, the *quality* of life is more important than the mere quantity of it.

Quality of life is a concept that is often raised in discussions of chronic disease management and end-of-life care. In human studies of adaptogens, an improvement in the quality of life is one of the most consistent findings. That should not be surprising, given that one of the traditional uses of adaptogenic herbs in their cultures of origin (various Asian countries and Europe) is as a tonic in convalescence and old age. Patients who take these herbs typically report feeling better, both physically and psychologically (mentally and emotionally).

In terms of measurable things, several of the adaptogens, particularly the ginsengs and *Rhaponticum,* increase muscle mass and thus strength, balance, and confidence. As one researcher noted, even a small increase in strength can result in big improvements in quality of life for elderly patients who have lost a good deal of muscle mass, as so much confidence and ability for self-care is lost along with it. I have noticed the same thing in my animal patients. Loss of muscle mass and strength as the body ages seems to rob the animal of his zest for life more than almost any other age-related factor. It also contributes to a

worsening of joint pain and debility in animals with arthritis, creating a destructive spiral of pain and weakness.

Simply by gaining in strength, the dog can gain a new lease on life. And just as with muscle mass, the adaptogens help reverse the mental decline so often associated with aging. They improve alertness, concentration, memory, and mood, and some (especially *Rhodiola)* improve the quality of sleep, an essential but often underappreciated aspect of good health. Unless the neurological deterioration is severe, adaptogens can help clear the mental fog that encases many old dogs, causing confusion, anxiety, forgetfulness, and even a reversion to pre-house-training days.

It's always wonderful to see the years fall away as the senior animal recovers her vitality, ability, and interest in life. When I see a formerly "old" animal romping and playing again, it's a really good sign. In fact, the quality-of-life index I use in my practice might just as well be called the play index, because the desire and ability to play is such an important indicator of well-being at any age. However you want to define it, isn't quality of life really what we want for our animals? A good life, whether or not it's a long life.

Final Thoughts

My own beloved dog is now in her senior years. Although she's very healthy, almost daily I catch myself thinking, "one day she'll be gone." I've done that for years, so perhaps it's just an occupational hazard. Or perhaps it's a fairly universal experience, a product of the inescapable foresight with which we humans have been "blessed." Regardless, these recurring thoughts of her demise make me treasure her all the more. They also prompt me to take the best possible care of her, because I want her to stick around for a whole lot longer.

There is no substitute for a healthy diet, daily exercise, appropriate medical care, and lots of love and attention. But in my experience, adaptogens can be a wonderful addition to the program in managing the chronic diseases as well as the general decline in vitality and interest so often seen in animals as they age. How long a much-loved dog remains with us matters a little less when we know we're doing all we can to make her life the best it can be.

Here's to our beloved canine seniors. Long may they play.

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Table 1. Some of the better known adaptogenic herbs.

Botanical name	**Common name and pronunciation**
Aralia mandschurica or *A. elata*	aralia; "ah-rah-lia"
Eleutherococcus senticosus	Siberian ginseng,* eleuthero; "el-oo-the-ro"
Panax ginseng	Chinese, Korean, or just Asian ginseng
Panax quinquefolium	American ginseng
Rhaponticum (or *Leuzea) carthamoides*	rhaponticum, maral root; "rap-on-tic-um"
Rhodiola rosea or *R. crenulata*	rhodiola, rose root, arctic rose; "ro-dee-ola"
Schisandra chinensis	schizandra; "sha-zan-dra"
Withania somnifera	ashwagandha; "ash-wa-gan-da"

* Siberian ginseng is not a true ginseng (i.e. a plant from the *Panax* genus), but it shares several properties with the "true" ginsengs, hence its common name.

Several of the medicinal mushrooms also have some adaptogenic properties. They include cordyceps, reishi, maitake, and shiitake.

Table 2. Specific effects of several adaptogens on key body systems.

Body system	Effects
Cardiovascular system	- improves function of the cardiovascular system under stress [all, but especially 4] - helps protect the heart from various insults (e.g. toxic injury, low oxygen) and helps reduce rhythm disturbances, improve heart function, and stimulate repair following cardiac injury [1, 2, 5, 6] - helps normalize blood pressure [3, 6] - helps normalize blood clotting and blood vessel integrity [2, 3] - helps correct anemia and other blood disorders [4, 5] - helps protect against high-altitude sickness [4]
Central nervous system	- improves physical and mental functioning, including learning and memory, when under stress and in the elderly [all] - helps protect the nervous system from various insults (e.g. toxic injury, low oxygen) and improves function and stimulates repair after injury [2, 3, 5, 6] - antidepressant [2, 6] - selectively helps calm animals prone to anxiety and enliven those with depression [4, 5] - improves sleep, counters insomnia [5] - enhances blood flow to the brain [3] - improves oxygenation and glucose supply to the brain [6]
Digestive system	- helps protect the stomach and intestines from ulceration; aids in healing gastric ulcers [1, 6] - helps protect the liver from various insults (e.g. toxic injury, low oxygen) [1, 2, 4, 5, 6] - improves bile production, both quality and flow [4]
Endocrine system	- helps normalize blood glucose and insulin levels [1, 2, 3, 4, 5] - has insulin-like or insulin-secreting effects [2, 3] - helps protect the insulin-producing cells of the pancreas [3] - helps prevent/resolve diabetic cataracts [1] - helps improve weight loss in overweight patients [1, 3] - reduces cholesterol [2, 3] - reduces stress-induced elevations in blood cortisol and helps protect against adrenal exhaustion and other organ effects of stress [5, 6] - may increase endorphin levels or act on endorphin receptors [5]
Immune system	- improves function of the immune system under stress [all] - increases white cell numbers and function, and increases immunoglobulin (antibody) production under stress [2] - anti-allergy effects [2, 5] - antibacterial [2, 4, 5], antifungal [4], and antiviral [2, 5] effects

	- helps protect against immune-mediated anemia [2] - helps stimulate wound healing [6]
All (anti-cancer effects:)	- inhibits cancer cell division and migration (metastasis) [2, 3] - induces programmed cell death (apoptosis) in cancer cells [1, 3] - helps protect against radiation damage [2, 6] - helps with quality of life and immune function following chemotherapy [3, 4, 6]

[1] *Aralia mandschurica, A. elata*

[2] *Eleutherococcus senticosus*

[3] *Panax ginseng, P. quinquefolium*

[4] *Rhaponticum carthamoides*

[5] *Rhodiola rosea*

[6] *Schisandra chinensis*

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