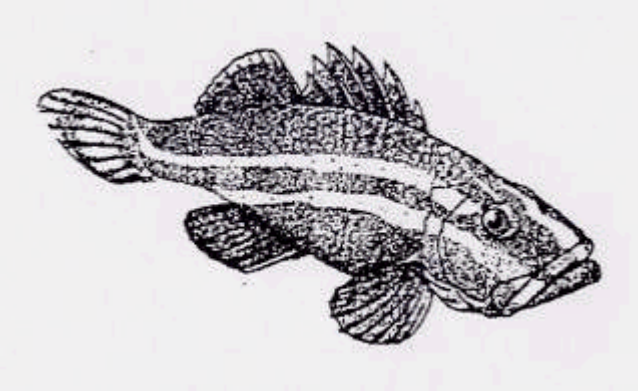

Ageless Animals News

INAUGURAL Newsletter!

September, 2004

In this inaugural issue of AgelessAnimals News, I'll share with you the beginning of this anti-aging project, a research collaboration that has now reached 14 universities -- twelve in the United States and two in Europe. Subsequent newsletters will update you on the research results from these pilot studies, and go on to explore fascinating information on long-lived animals. Included will be intriguing data showing rockfish documented at least 205 years old, at the same time that several other rockfish have never been found older than a dozen or so years. We'll discuss the longevity of whales, who are warm-blooded mammals like ourselves. Recently Bowhead whales have been documented to live in good health up to 211 years old (in this case the whale died when it was harpooned by Native Americans). But more on that in later newsletters.

To start with, I'd like to take you back to August, 1995, when I started the project that is now known as AgelessAnimals (and is also known as the Centenarian Species and Rockfish Project). Previously I had worked for many years directing financial projects for a large retail company in Portland, Oregon. These projects involved money orders, gift certificates and pharmacy billings, among others.

But I felt the need to use my project management skills in a way that would make a more important and meaningful contribution than my work in retail management. So in 1995 I spent several months researching the field of biogerontology (the biological study of aging). For most of my adult life I had been fascinated with the concept of extending healthy lifespan. In August of that year I read *How and Why We Age*, by Dr. Leonard Hayflick. A chapter in his book was entitled "Some Animals Age, Some Do Not". I was astounded that some animals showed no signs of aging! Although ideas about extreme longevity are not uncommon in folklore, this was the first time I had read a scientific source citing this information.

I spent the next three months uncovering all I could find out about long-lived animals. In Caleb Finch's *Longevity, Senescence and the Genome* I read about 'Negligible Senescence', a term he coined for long-lived animals with

indeterminate lifespans. Finch divided aging into three categories: Rapid-, like the salmon, Gradual-, which included species from insects to mice to man, and Negligible Senescence, which included animals like rockfish, turtles and whales.

Later that fall I came across another source that provided tantalizing information about long-lived animals: *Ageing In Cold-Blooded Vertebrates*, edited by B.K. Patnaik, Berhampur, India (Special Issue: Vol. 40, No. 2-4 (1994) Gerontology). The data it discussed showed that although many cold-blooded vertebrates lived a relatively short lifespan, some fish and reptiles lived well over a century.

In November 1995 I attended the Gerontological Society of America (GSA) meeting and met Leonard Hayflick in person. I told him of my interest in long-lived animals and of my project management background. I asked him who was working in this area. His answer was "Nobody is, but they should be!" Thus started my journey to promote research on how long-lived animals are able to retard aging so successfully.

I then spent almost eighteen months, from late 1995 into early 1997, trying to find the "ideal candidate" for this study of long-lived animals. Koi, or fancy carp, were a potential candidate suggested to me by one of the initial researchers I met. They were popularly believed to live over two hundred years. During that time I contacted koi traders who traveled to Japan, koi club websites around the world, fish ecologists who specialized in carp; basically anyone I came across who might have information on these colorful fish.

But solid, scientifically validated evidence that these fish lived such long lives was elusive. Finally, a koi trader told me that back a century ago, these Japanese farmers were poor and illiterate, so it was unlikely that any records existed to validate the grandiose ages claimed for these fish. He also mentioned that with time koi tend to lose their coloration (the colors are actually mutations they are bred for). He said at that point a farmer would likely have just thrown the older koi out into a stream. He ended by saying "I think you're chasing a red herring!" My search to find the ideal candidate for negligible senescence was stalled.

Shortly after that, in April 1997, I received data from the Alaska Fish and Game on randomly sampled Yelloweye rockfish, commercially caught off of Sitka, Alaska. The charts they provided showed that 16% of the fish going to people's dinner tables were 50 years of age or older, with several over 100 years old! With the knowledge that long-lived animals of this age were commercially available, rockfish became the major research effort of the AgelessAnimals project.

In May of 1997 through an Internet anti-aging discussion group, I was referred to two Oregon State University fish ecologists. Ironically, the person

who referred them to me later sent me a letter saying I really should consider studying short-lived fish. They can be better controlled in the laboratory, he said, their short life will fit into funding cycles, and with long-lived animals there is no easy way to test variables. He was right. A typical laboratory method studies an experiment's effect on future generations. If we tried that with rockfish, we'd be dead long before they would! But that really missed the point of why we should study long-lived animals in the first place.

So just what is the point? It is that we should pay more attention to naturally occurring long-lived animals, in order to uncover the biochemical and genetic differences between short-lived and long-lived animals. Instead, the tendency of aging research is to concentrate on genetic manipulation to extend life span. This is misleading in that the manipulation is a laboratory artifact that might never occur in normal aging, and so might not provide useful information for the extension of healthy life span in humans.

But fortunately the two Oregon State researchers were intrigued at this chance to examine and test rockfish. In fact, they told me they had previously searched for samples of long-lived sturgeon but were unable to find any. Jerry Hendricks, now retired, was a fish histologist. His colleague, David Williams, is a biochemist now with the Linus Pauling Institute at Oregon State University. Jerry proposed to perform histological examinations of several rockfish tissues. Dave proposed subjecting rockfish liver samples to oxidative stress and measuring their resistance.

I contacted Victoria O'Connell, the Alaska Fish and Game fish ecologist who had provided me with the original data. She was preparing for a fishing expedition, and agreed to provide us with samples of five younger and five older Yelloweye rockfish. (Their age is determined by looking at their bone under a microscope, a concept very similar to counting tree rings. See the Home page of agelessanimals.org for more information on otolith aging techniques.) We requested that the histology samples be stored in formalin, and the liver samples for testing oxidative damage be frozen. But unfortunately, the date for the fishing expedition was moved up, and we weren't able to get supplies to her in time. So our first ten rockfish ended up being packed with ice and shipped whole to us the day the boat returned to port.

We knew that because of the elapsed time it was unlikely any meaningful research could be conducted and this turned out to be true. However, those ten rockfish made excellent fillets! And perhaps most interesting, of the five older fish, the youngest was 79 years old, and the oldest was a 109 year old female, fertile with eggs when she was pulled up! That provided quite an exciting start to the research efforts, and gave me the inspiration to originally call the research "The Centenarian Rockfish Project".

Subsequently, the project received rockfish organ samples up to 101 years old from three separate fishing expeditions. These included liver, heart, brain, kidney and spleen tissues. Later, Greg Cailliet, a fish ecologist from Moss Landing Marines Laboratories in the Monterey Bay area of California, collaborated with this project to collect blood serum samples. Then in a very intriguing survey of rockfish, he compiled data that showed rockfish have both short-lived and long-lived members in the same genus (Sebastes). He found that maximum rockfish longevity ranges in age from 12 years for the calico rockfish to 205 years for the rougheye rockfish. This topic of why long-lived rockfish retard aging when short-lived rockfish do not will be the subject of upcoming newsletters.

Today, in 2004, the project's research is actively searching for the mechanisms that allow continued vitality in these long-lived animals. With that knowledge it will help us understand why humans are healthy for many years, but then start having more and more age-related problems. Because of our aging population, the research will have enormous benefits for humanity, not only in greater health and enjoyment of later years, but in controlling the escalating costs of Social Security and medical care.

Only a few projects in the world study long-lived animals. AgelessAnimals News reports the latest research to both general and gerontological audiences. Research from the 14 pilot studies encompass topics from Free-radical damage to DNA Micro-array gene expression. The research results will be included among the topics I'll address in subsequent newsletters.