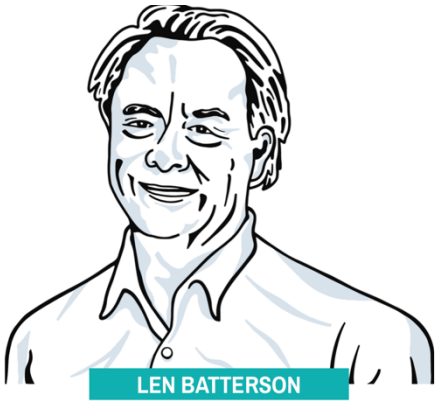
# Age Extension and Life Everlasting

## Our Genes and Human Regeneration

*Len Batterson, VCapital Founder, CEO, and Chief Investment Officers ponders everlasting life as the firm introduces Rejuvenate Bio for a Series A investment round.*




**Why don't humans live longer?**

**Why do our dogs not live as long as humans?**

**Why do certain fish live for many hundreds of years, and why are jellyfish essentially immortal?**

**Is human immortality possible or even desirable?**

These are questions that mankind has asked for thousands of generations. And emerging now are the tools not only to begin to answer some of these questions, but even to begin to extend life and suggest the potential for discovering the pathway to life everlasting.

Humans grow old through the process of aging. Scientists call this "senescence." The body and mind essentially wear out and wind down, and we lose mastery of ourselves and our world. Organs previously reliable then fail in their functions, as the cells that compose the organs degrade and eventually die, while new cells are not sufficiently prolific to take their place. Genes that once regulated bodily functions and produced the new proteins that acted as building blocks of the human body decay and deregulate, at times producing an excess of what the body needs and at other times less, resulting in disease.

**If a jellyfish can live forever, then why can't human beings? Why is the inevitable end death, and not an ever-repeating joy?**

It has often been postulated that we humans must die to make room for the next generation. This presumption prevailed for millennia.

However, as knowledge has grown and increasingly been brought to bear on improving the human condition, human life spans have on average increased. The pace of increase even accelerated during the 20th century, aided by tools and methods of modern science that generations ago would have been viewed as akin to magic.

Yet broad swaths of humanity still struggle for survival. For many, life is still harsh and disappointingly brief.

In humans' quest to see as far as the eye can see and even beyond, scientists have hypothesized that, since human genes are never exactly the same from one individual to the next, through survival of the fittest, evolving genes would result in future generations with increasingly superior abilities and longer life spans. Some even have wondered whether this expanding horizon might open the pathway to immortality.

That potential pathway began with the remarkable discovery of the genetic code of life and the first sequencing of the human genome over the period 1990-2003. The magnitude and significance of this discovery is underscored by the lengthy duration and enormous cost of the process.

The genome is conceptually a recipe book contained in almost every cell of the human body. That recipe book details ingredients and instructions, for example how to build a specific protein and what role that protein will play in the body.

While there are still many gaps in the ability to read and implement every instruction, current scientific knowledge includes the role of many specific genes, how those specific genes work together… or not… and how variants of genes may arise through mutations.

Knowing the aggregated human genome enables comparison of an individual's genome to the human "standard." That provides clues as to what genes may not be functioning properly that are leading to disease. This in turn increasingly is enabling discovery of medications which may cure the disease and/or genetic injections or alterations which may introduce new fully functioning genes that, once "turned on," take over the missing or disabled function of the aging gene. Essentially genome surgery!

**This isn't just science fiction.**

In 2012, a molecular scalpel was conceived (CAS9) which could be used to cut DNA at a mutation site and then provide a normal piece of DNA as a repair mechanism, so a cell could then repair its own genome. With this molecular scalpel, George Church, world renowned Harvard Medical School geneticist, and his colleague Feng Zang demonstrated that human cells could be edited. This created the potential for editing the human genome back to normal rather than just delivering copies of new genes or silencing the effect of mutant genes.

VCapital's latest portfolio company addition, Rejuvenate Bio, was founded by Dr. Church, who previously founded or co-founded numerous companies in biotech and genetics with several PhD scientists from his lab. This company's plan is first to use the newest genetic technology to cure major animal disease and then rapidly expand technology application to humans.

For humans, the plan is to begin with developments curing or regressing a number of major diseases and then eventually reversing the precursor of most, if not all, major diseases -- aging. If the Jellyfish can repurpose its aging cells and turn them into the mother of all cells, stem cells, again and again, then what might humankind ultimately achieve against the specter of disease, old age, and death?

Contact Len with your thoughts on the subject.