Members of the Academy for Health and Lifespan Research believe we are at a "threshold moment" in the research of age-related decline.

The Quest for Longevity

Americans continue to live longer than ever, but now scientists are looking for ways we can age better, free of the diseases that make our senior years a scary time.

BY ANNE MARIE O'CONNOR

"Before having breakfast, I pick up my newspaper, get the obituary section and see if I'm listed. If I'm not, I'll have my breakfast," quips 96-year-old director and comedian Carl Reiner in the 2017 documentary, *If You're Not in the Obit, Eat Breakfast*. Reiner goes on to ponder why he won the longevity lottery: "How come we got the extra years? Was it luck, good genes, modern medicine? Or are we doing something right?"

It's a mystery people have been contemplating for millennia. What is the secret of extraordinary longevity? Why do some people live healthy lives, still vibrant on their 90th, 100th birthdays, and even longer? And why do some people start to move slowly and stiffly, ending up on drugs for diabetes, blood pressure and cholesterol by the time they're 40 (or even younger), while others are running marathons or climbing Machu Picchu at 90? Is it good genes, a pill, exercise, special diets, supplements, a lifestyle or a positive outlook?

A LOT OF PROGRESS

Back in the Stone Age, life expectancy at birth was 25 years, according to Oxford University statistics. The number barely budged until the 1800s, when it began to slowly creep up.

By 1900, the average American's life expectancy was about 49 years. But over the next 100 years, it would skyrocket to around 77 years. "The reasons for the increase were public health measures–cleaner food, better water and childhood vaccinations," says Steven Austad, Ph.D., a biogerontologist and professor of biology at the University of Alabama at Birmingham. Other factors include the development of antibiotics and other medical advances and safety measures (seat belts, helmets, speed limits, not putting asbestos in buildings).

"In the past few years, it's really been a diminution in deaths from the diseases

There's isn't a 'longevity' gene per se, but aging is governed by hundreds of thousands of genetic factors.

of old age," says Austad, who's also the scientific director of the American Federation for Aging Research. "Just in the 21st century, deaths from heart attacks and strokes have declined by more than 33 percent due to better blood pressure control, better control of blood lipids [cholesterol] and the lowered smoking rate. Cancer deaths have also declined to a lesser extent, due to earlier–and better–medical diagnosis and better treatment."

LOTS OF 100TH BIRTHDAY PARTIES

These advances in longevity have resulted in exploding numbers of centenarians (people who are 100 or older). According to United Nations estimates, there were nearly a half-million centenarians in 2015, more than four times as many as there were in 1990. And it's estimated that by 2050, there will be 3.7 million centenarians around the globe. As the baby boomers–America's largest living generation (though millennials are poised to surpass them this year)–age, we can expect those numbers to grow.

QUALITY VERSUS QUANTITY

But the goal isn't just to have the *longest* life span ever, but to have the longest *health span,* which is the experts' term for a healthy, vibrant, fulfilling old age, unencumbered by disease or dementia.

Unfortunately, health span has lagged behind life span. Despite the many medical advances, age-related chronic diseases such as cardiovascular disease, diabetes and Alzheimer's have replaced contagious diseases as the biggest causes of death. Sure, we'd all love to live to be 100, if we can live independently, be mobile, remain cognitively sharp with an active social life–not bedridden with dementia.

THE FUTURE'S SO BRIGHT

In this book, we'll look at the most promising research to help you achieve a long–and healthy–life. The World Health Organization estimates that if more people were to stop smoking, lose weight and exercise regularly, 80 percent of heart disease, stroke and diabetes cases, and 40 percent of cancer cases, would be prevented.

Austad also points to some of the other most promising advances, especially "drugs that have been around for a long time, but that we didn't realize were beneficial for healthy people because we typically only gave them to sick people–in particular, metformin and rapamycin."

HOW MEN AND WOMEN AGE DIFFERENTLY

Until recently, scientists thought men and women aged in pretty much the same way, says Steven Austad, Ph.D. "One thing we've known since the 1930s that makes animals age more slowly was dietary restriction, which works about the same in both sexes. So we thought that aging had to be pretty much the same in both sexes."

Not so. "It came as a complete surprise to the scientists who study aging that men and women age differently, just as we've learned that the mechanisms for some kinds of pain is different in males and females," Austad says. "Even though women live a lot longer, they get many more chronic diseases than men do. So late in life, women tend to be less healthy than men. Men, when they start getting sick, they fall apart and that's it."

Many centenarian studies have three or four women for every 100-year-old man, he notes; it turns out, however, if you only look at healthy centenarians, the ratio is closer to 1:1.

"A scientist friend of mine did a study of healthy centenarians," Austad says. "His study was 1:1 male/ female because participants had to be healthy—and men who are still alive at that age tend to be healthier."

This male/female differential will have a major effect on the medications prescribed for older people, he points out. "We also know of six or eight drugs that seem to treat aging, but most of them work only in one sex—mostly in males. This suggests to me that there are differences in our fundamental aging process, just like there are differences in the way we experience pain. Ultimately this is going to change the way we do medicine. I think this is really going to be where personalized medicine starts—if you're a man, you'll get this treatment; if you're a woman, you'll get that treatment."

Although on average women live longer than men (81 years versus 76), men remain healthier longer.

Q. Are there a lot of scams in the field of antiaging?

A "How long have you got? Most [treatments] on the market are scams!" says Steven Austad, Ph.D. "That's always been the case. It's something we struggle against in the field."

So how do you spot a scam? If it's on an infomercial or an internet ad, it's probably a scam. Does it promise a quick fix, a medical breakthrough or a miracle cure for a problem that's been plaguing humanity for centuries? It's probably a scam. If you Google it, are the first results links to the CDC, the NIH or a major health nonprofit (the American Cancer Society, Mayo Clinic)... or do the links direct you to a website you've never heard of that just so happens to be selling the miracle cure? (And it's pricey?) Yup, it's probably a scam.

Also beware of ordering prescription drugs from unknown vendors on the internet; they may be counterfeit, warns the Association of Certified Financial Planners. Yes, they might be a lot cheaper, but there's no guarantee you're getting what you need.

He's also optimistic about other drugs that are currently in development that target senescent cells, also known as "zombie" cells. These are cells that have stopped functioning and instead "they start secreting all these damaging molecules," he explains. Scientists are developing senolytic drugs that target these cells. (For more information on metformin, rapamycin and senolytic drugs, see "Medical Breakthroughs," page 42.)

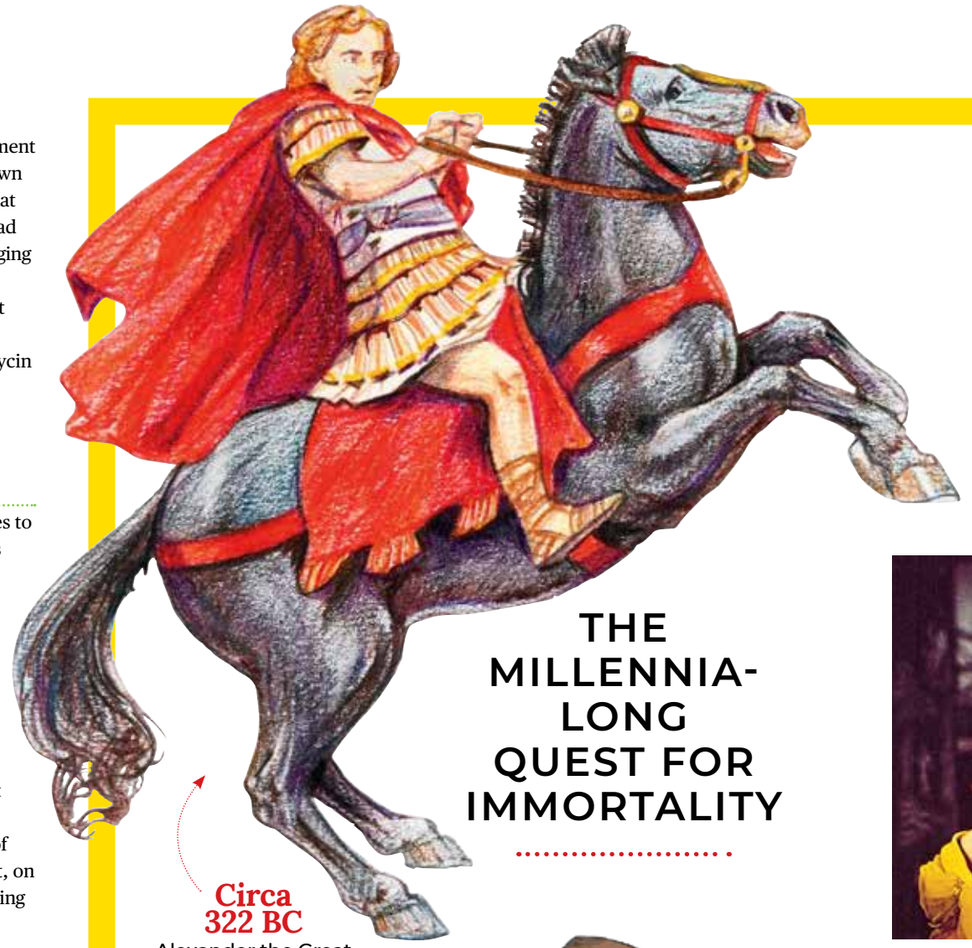
TRY THIS "WONDER DRUG" TODAY

But while waiting for these advances to hit a CVS near you, Austad suggests taking advantage of the one thing that has been proven to work: "The thing that's turning out to have more and more benefits and hasn't been fully appreciated until now is exercise–or as it used to be called, life. It has beneficial effects on your heart and your lungs–and also your brain. Although it doesn't have a huge impact on longevity–people who exercise live a couple of years longer than people who don't, on average–it's a wonder drug for staying healthy, mentally and physically."

Why Is Life Expectancy in the United States Falling?

After decades of steady increases, Americans' life expectancy at birth in the United States declined for the third straight year in 2018, according to the Centers for Disease Control and Prevention. The drop has been driven in large part by young and middle-aged people dying from drug overdoses and suicides. Experts hope that a slight downtick in fatal opioid overdoses in 2018 is the start of a long-term downward trend.

THE MILLENNIA-LONG QUEST FOR IMMORTALITY



Circa 322 BC
Alexander the Great crosses the Land of Darkness to find the Water of Life that offers eternal life. Ironically, he dies at age 32.

1200–1700
Medieval alchemists seek the "elixir of life," a potion that will cure all diseases and allow man to achieve immortality.

1513
Ponce de León arrives in Florida in search of a Fountain of Youth; 500 years later, Florida remains a haven for seniors.

1597
Italian doctor Gaspare Tagliacozzi writes the first plastic surgery textbook.

1890
Oscar Wilde's *The Picture of Dorian Gray,* about a handsome young man whose portrait ages while he remains youthful, is published. Sadly, the story is fictional.

1901
Eugen Holländer, a German doctor, performs the first face-lift, on an elderly Polish aristocrat.

1944
Benjamin Green develops a sunscreen to protect American troops in the tropical Pacific theater in WWII. The formula is the basis of Coppertone.

1950s
Doctors inject an early version of a dermal filler, silicone, into the face for a plumper, more youthful look.

1977
A Dannon commercial featuring elderly Soviet Georgians links longevity with eating yogurt.

2002
Botox receives FDA approval for the treatment of wrinkles (though doctors had already been using it "off-label").

2016
The FDA approves a clinical trial of diabetes drug metformin to see if it can also extend the human life span.