

From VOA Learning English, this is **Science in the News**. I'm June Simms.

And I'm Jim Tedder. Today we tell about a newly-discovered body clock that provides clues to aging. We hear how learning new skills may help to keep an aging mind sharp. Finally, we turn to the night skies and tell about efforts to reduce light pollution in the American state of Colorado.

There is good news for people who are searching for the fountain of youth! A new report says you just might find the answer in your DNA or genetic material. The report offers information on why our bodies age and how we can slow down the biological clock operating in our genes.

University of California genetics professor Steve Horvath has created a tool that can correctly measure the aging body.

“Basically, I developed a way of predicting age based on DNA. To achieve this goal I identified 353 markers on the DNA which measure DNA methylation levels.”

Methylation is a natural process that chemically changes the DNA. It is important in the development of every organism.

Professor Horvath and his team collected information from 8,000 samples in 82 publicly available DNA-methylation data sets. They used this information to identify methylation in healthy and diseased organs, tissues and cells, from human fetuses to people 100 years of age and older.

“For one thing, I find that this epigenetic clock ticks fastest during development, and after age 20 it slows down to a constant ticking rate. But also I find that cancer tissue is on average 36 years older than healthy tissue and I observed that effect in all 20 cancer types that I studied.”

In other words, some cells age faster than others.

Professor Horvath notes that most biological samples matched their chronological age – the actual age of the individual. However, some differed greatly. For example, the average human heart appeared to be 12 years younger than its chronological age. And a woman’s healthy breast tissue aged faster than the rest of her body.

“So it is possible that the cancer that is adjacent to this tissue accelerates the age. Having said this, I had one data set that was composed of truly healthy breast tissue and even there did I observe a significant age acceleration.”

The results may explain why breast cancer is the most common cancer in women.

Surprisingly, Professor Horvath says the clock was a good measure of time across the human body.

“This new epigenetic clock really frees us up from focusing on one tissue at a time because it really works in most tissues and organs and cell types.

And the great advantage is that we now can compare the ages of different tissues and organs from the same individual.”

He says the study holds promise for studying human development, aging and disease. It also offers hope for repairing tissue.

“Of course, it has been a long-standing hope to find therapies or compounds that keep us young, and if this epigenetic clock measures a process that causes aging, then we will have a tool that allows us to evaluate compounds that keep us young.”

Steve Horvath says the big question remains whether the biological clock actually controls a process that leads to aging or simply is a sign of it. The report was published in the journal Genome Biology.

Another report says older adults who test their minds with increasingly difficult projects have better mental ability than those who do less demanding activities.

To keep our brains sharp as we age, we are often told to keep our minds active. As the old saying goes, “use it or lose it.” But, there is very little scientific evidence to support that. So says Denise Park. She is a psychologist with the University of Texas at Dallas.

“Partially because it is very, very hard to do experiments with humans, where you randomly assign them to conditions where, say, you retire, you do not retire; you do interesting things, you do boring things.”

Denise Park is head of the university’s Center for Vital Longevity. She designed a study in which she and her team placed 221 healthy aging and older adults into one of three groups.

“We asked people to learn new things, like quilting or photography. We asked other people to just do fun things like be in a social group. And then we asked other people to do things at home that seemingly would help their cognition or their mental function but were not likely to have a very large effect.”

The subjects took part in their assigned activity for 15 hours a week over three months. At the end of that time, the researchers found that the adults who learned new skills, such as digital photography, showed the greatest improvements on memory tests.

No improvements were seen in the results of those in the social group that did activities together like go on field trips. There were also no improvements among the third group that listened to classical music or did crossword puzzles.

Denise Park believes one reason for improved memory in the active learning group is that its members were being pushed to learn new skills. The other groups took part in what she calls receptive activities.

Learning new skills may not cure age-related mental decline. But, Ms. Park thinks being mentally active slows down the process.

“So, I am not as interested in improving the function of people as they age in their later years. I am more interested in showing ultimately over time that by these novel experiences that involve a lot of mental operations that we can slow the rate at which people cognitively age.”

Denise Park says the latest information shows that the improvements lasted for at least a year. She and her team plan to do longer follow-up studies with all three groups. She also is interested in learning whether taking part in demanding mental activities delays the development of conditions like Alzheimer’s disease.

The report on the value of learning new skills was published in the journal Psychological Science.

One of life’s great wonders is a starry night sky. But as electric lights turn city streets and neighborhoods bright as day, it is getting harder to see those stars. That has astronomers, politicians and others looking for ways to reduce what is called light pollution.

Nightfall has come to the University of Colorado Observatory in Boulder, Colorado. As the skies darken, student astronomers work under the glow of lamps that have red filters. Astronomer Eric McNeil says there is just enough light to use the telescopes and see stars.

“White light has a tendency to ruin your night vision, so astronomers like to use red light which has a tendency not to do that.”

Fabio Mezzalira is the director of the observatory. He says for most people living in the cities, stars are rare.

“The one thing missing in the modern experience is that people at one time, knew, by default, the sky. They saw it every night, simply because there was no light pollution to be worried about.”

While he covers his own lamps with reddish filters, Mr. Mezzalira worries about nearby businesses lighting up the night skies.

“The biggest offenders are the gas stations and liquor stores. Blue lights, blue and green, very bad, they're terrible! Terrible! They're good to see with. But a lot of people like the night sky, they want to see the stars.”

Writer Paul Bogard agrees that city lights destroy the magic of the night.

“We're missing about 95, 96, 99 percent, in some cases, of the stars that we should be seeing.”

Mr. Bogard is the author of *The End of Night, Searching for Natural Darkness in an Age of Artificial Light*.

“You can go to a large city or to an American neighborhood that's lit up, and you can see the brightest stars, but we quickly lose sight of all the stars that are dimmer than the brightest. And that's the real loss.”

He says that dark nights are important for our health. Light pollution can interfere with the body's natural sleep cycle.

“All life evolved in bright days and dark nights. And Life needs darkness to be truly healthy. We’re using way too much light.”

To make his point, Paul Bogard takes a walk through an outdoor shopping center at 11 o’clock at night. At this hour, these businesses are closed, but many stores remain lit up. They include a computer shop, where the front wall shines light onto the sidewalk, especially through its big sign.

For examples of less objectionable lighting, Mr. Bogard points to trees on the grounds of the shopping mall. They are decorated with small golden lights.

“The twinkle lights here, are in many ways beautiful.”

He also praises how the streetlights point down, directing the light to the sidewalk.

“You can’t even see the bulb. They’re shielded, so the light is going down to the street. We have as much light as we need on the street. But we don’t have any light shining into the sky or into our eyes.”

Nancy Clanton is a lighting engineer and a leader of the International Dark Sky Association. She says Boulder has less light pollution than most cities. She says that is because Boulder passed a light pollution law 10 years ago.

“The ordinance was basically saying, let’s start with no uplight, so it says, use what we call full cut-off lights, which are fully shielded.”

Boulder also has some area of housing with no streetlights at all. Paul Bogard says that creates an extraordinary view of the stars and constellations.

“You can see the big dipper, the summer triangle -- what’s unique to this street is that you can see a lot of other stars that I don’t even know the names of.”

Back at the University of Colorado, observatory director Fabio Mezzallira says star gazing experiences stay with people. They have definitely stayed with him.

“The first time I really realized more the universe around me was when I was about 11 years old, and I was laying on a beach and there was no light pollution. Zero. You could see the Milky Way, and the sky was gray with stars.”

The International Dark Sky Association offers model lighting plans on its website for communities that want to limit light pollution and keep the stars in view.

This Science in the News was written by June Simms, who also served as our producer. I’m Jim Tedder.

And I’m June Simms. Join us again next week at this time for more news about science on the Voice of America.

