7 ways advancements in science could impact your life

These real world applications of science change — and save — lives everyday.

BY BG BRANDLAB | July 3, 2020

Google image search for "science" and you will find beakers and test tubes, microscopes and safety goggles, and cartoon drawings of atoms and helices. But these are the means to an end, and that end affects our daily life, and our future.

Here's how notable scientific breakthroughs might apply for you or the people you love.

1. Rewriting DNA to treat diseases

The Human Genome project was a 13-year collaborative effort launched in 1990 to map the human genome. It is regarded as one of the most ambitious and impactful scientific projects to date. What does that mean for you? Mapping all three billion DNA letters in the human genome paved the way for precision medicine, an emerging approach to care that enables doctors to use genetic information to determine the best course of treatment for each patient.

Not only can we map the genome, we can edit it. CRISPR/Cas9 is a revolutionary tool that allows scientists and researchers to alter DNA sequences with unprecedented speed, accuracy, and affordability. This helped to open up a new world of treatment: gene therapy, in which genes are used to treat or prevent disease.

2. Beating cancer with immunotherapy

For decades, chemotherapy has been a mainstay of cancer treatment. While effective, the treatment causes significant side effects. Immune checkpoint inhibitors are a "radical new direction" for cancer treatment, explains Jeremy Schafer, SVP and director of the Access Experience Team at PRECISIONvalue. Whereas targeted therapies like chemotherapy work by attacking specific cell receptors, immunotherapy works by harnessing a patient's immune system to fight the cancerous cells.

"The result has been unprecedented increases in survival with a better safety profile," Schafer says, meaning fewer side effects than traditional cancer treatments. "Perhaps the key to cancer all along will be working with the human body rather than damaging it."


Andrew Cournoyer

CAR T-cell therapy is a type of immunotherapy that harvests a patient's own T-cells and genetically modifies them to attack cancer cells. While there are only a few FDA approved CAR T-Cell therapies, there are close to 400 clinical trials in development, says Andrew Cournoyer, who also works at PRECISIONvalue as vice president and director of the Access Experience Team at PRECISIONvalue.

3. The multiple applications of stem cell therapies

Stem cell therapy, also known as regenerative medicine, uses stem cells or their derivatives to promote the repair of injured or diseased tissues. Its potentially life-saving applications include facilitating the next chapter of organ transplantation, as scientists work to use stem cells to grow organ constructs outside of the body, rather than having to rely on a donor.

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Doctors already use stem cells in therapies to fight some types of cancer and blood-related diseases. Celularity is a clinical-stage cell therapeutics company that develops cellular therapies engineered from postpartum human placenta. It is investigating Natural Killer (NK) cell therapy as a potential treatment for various hematologic cancers and solid tumors. It also has the first cell therapy with emergency authorization approval by the FDA for use as an Investigative New Drug (IND) to treat COVID-19.

CAR T-cell therapy requires customizing the cell therapy to each patient, whereas Celularity's NK cells are allogeneic therapies, meaning any patient is safe to use the same therapy without customizing it, and it is highly unlikely a cancer patient will experience any unintended side effects. Celularity also has a breakthrough in cell therapy manufacturing that replaces the conventional way of producing in large batches with a new way of continuous manufacturing designed to reduce the time and cost of bringing a commercial-scale treatment to market.

4. The evolution of Hepatitis C therapies

Erin Lopata, senior director of PRECISIONvalue's Access Experience Team, cites the evolution of therapies in the Hepatitis C space as one of the most impactful scientific breakthroughs.


Erin Lopata

"The treatments available for this condition went from a year-long, injectable treatment that carried a low success rate and that most patients could not tolerate, to relatively easy to use and prescribe oral therapies that can cure most patients," she explains.

5. Fertility treatment: new hope for couples

Fertility treatments have helped millions experience "the miracle of life." New Hope Fertility offers a variety of traditional fertility treatments, but medical director Dr. John Zhang says the most exciting breakthrough is Mini-IVF treatment, its trademarked minimal stimulation in vitro fertilization protocol.

The clinic has been using the method since 2004. It eliminates the need for injection, instead using oral medication to stimulate the ovaries to produce the maximum number of "quality" eggs in a single cycle and, in turn, a woman's best chance for a healthy pregnancy, Zhang says.


Dr. John Zhang

"Any woman who goes through traditional IVF will tell you how hard it can be because of all the injections and medications she has to take, but with mini IVF, it is different," he explains. "The expression no pain, no gain should be no pain, all gain."

Zhang notes an injection-free approach also allows women to do 85% of treatment at home. He believes at-home IVF will become the new norm in fertility care.

6. Better screening for mom and baby

Karen Madden, Ph.D., vice president of technology and innovation at PerkinElmer, a diagnostic, life sciences, and environmental testing instruments company in Waltham, Mass., believes that for many years, women's health has not received the necessary attention and funding. This is beginning to change. "FemTech," technology that addresses a variety of women's health issues, is on the rise..

PerkinElmer's Vanadis non-invasive prenatal testing (NIPT) solutions test expectant mothers for pregnancy-related health risks and fetal abnormalities. The test is designed to reduce the complexity and cost of noninvasive prenatal testing so that it may be accessible to more women. The company also screens newborn babies for genetic mutations associated with life-threatening disorders. Since 1985, almost 600 million babies have been screened with its products. Every day more than 70 babies around the world get a healthier start to life thanks to the early detection of a serious disorder, says Madden.

7. Advancements in mental health

Dr. Neha Chaudhary, cofounder of Brainstorm, Stanford's Lab for Mental Health Innovation and a psychiatrist at Massachusetts General Hospital and Harvard Medical School

Dr. Neha Chaudhary, cofounder of Brainstorm, Stanford's Lab for Mental Health Innovation and a psychiatrist at Massachusetts General Hospital and Harvard Medical School, believes new objective measures and diagnostics for behavioral health are some of the most impactful scientific developments of the last few years.


Dr. Neha Chaudhary

She notes mental health has been lagging behind the rest of medicine for decades, but it is seeing significant advancements lately in areas like voice analytics, digital therapeutics, and "something we call digital phenotyping — the use of data from personal devices as a way to describe someone's mental status and potentially predict changes from baseline," she explains.

Despite advancements, Chaudhary believes mental health is still ripe for disruption, "especially when we consider moving beyond the wellness space to tackle serious mental illness, which when combined with neurological diseases has the highest burden of illness of all diseases worldwide." ■