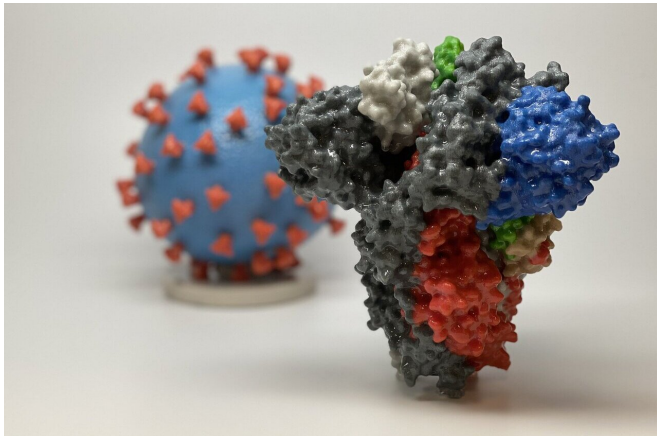


Best of Last Year: The top Medical Xpress articles of 2020

16 December 2020, by Bob Yirka



3D print of a spike protein of SARS-CoV-2, the virus that causes COVID-19--in front of a 3D print of a SARS-CoV-2 virus particle. The spike protein (foreground) enables the virus to enter and infect human cells. On the virus model, the virus surface (blue) is covered with spike proteins (red) that enable the virus to enter and infect human cells. Credit: NIH

It was a good year for medical research of all kinds, as a team of researchers at the University of California San Diego found [a connection between gut bacteria and vitamin D levels](#). They discovered that gut microbiome diversity could be closely associated with active vitamin D, but not the precursor form—instead, it was the active form that had been metabolized.

Also, a team at the University of California, Davis found that [surgical and N95 masks block most aerosolized particles emitted during breathing, talking and coughing](#). But they also found that most homemade masks released a large amount of fibers into the air from the mask during the same activities, prompting the researchers to suggest that their results underscore the importance of washing masks after every use.

And Anna Aksenova, a senior research associate at the Laboratory of Amyloid Biology at St Petersburg University, suggested that a [severe course of COVID-19 may be associated with the von Willebrand factor](#). She noted that in some people, replication of the virus stimulates the development of microdamage on vessel walls. She theorized that this damage prompts the body to release von Willebrand factor into the blood as a way to patch the holes.

Also, William Bryan, a science and technology advisor to the Department of Homeland Security Secretary Chad Wolf announced during the early days of the pandemic that [sunlight destroyed the coronavirus quickly](#). He cited a [government study](#) that had shown ultraviolet rays in sunlight had a potent impact on the SARS-CoV-2 virus, making outdoor surfaces safe to touch.

And a team at the University of Arizona Health Sciences found that [SARS-CoV-2 antibodies provide lasting immunity](#). This finding suggested that those who had survived an infection and those who received a vaccine for COVID-19 would be immune from reinfection for several months. More specifically, they found that long-lived plasma cells provided immunity for at least five to seven months—and perhaps much longer. Not enough time has elapsed since the virus emerged to test for longer periods.

Also, as the pandemic has worn on, some people began wondering [if face shields might be a better option than facemasks](#). Dr. Amesh Adalja, a senior scholar with the Johns Hopkins Center for Health Security suggested they might just be a better option for some people because they are more comfortable. Dr. Frank Esper, a pediatric infectious disease specialist at Cleveland Clinic Children's Center agreed, noting that they also protect the eyes—a less well-known means for viruses to enter the body. Both noted that studies have shown face shields are just as good at reducing viral exposure

as face masks.

And a team at the University of California, San Francisco found that [the ketogenic diet alters the gut microbiome in humans and mice](#). The popular low-carb, [high-fat diet](#) attracted a lot of attention from researchers over the past year, as public interest increased. The team in California found that such diets can have a dramatic impact on the microbes residing in the human gut, resulting in suppression of inflammation, possibly benefiting people with autoimmune disorders.

Also, a team of researchers at Northwestern Medicine found yet another way that the SARS-CoV2 virus can harm people—they reported [evidence of injury to placentas from COVID-19-positive pregnant women](#). In testing 16 pregnant COVID-19 positive women, they found evidence of placenta damage in all of them, resulting in abnormal blood flow between mother and fetus.

And a team at the University of British Columbia [tried to set the record straight regarding people taking ibuprofen if they have COVID-19](#). They noted that a negative link between the two was a myth that had taken on a life of its own after a French doctor tweeted that people with COVID-19 should not take ibuprofen because it could increase their chances of developing pneumonia. The researchers pointed out that to date, there is little to no evidence suggesting that ibuprofen can make COVID-19 worse.

Also, a team at the Stanford University School of Medicine found [a way to regrow cartilage in joints](#). Loss of cartilage in the joints can lead to pain and the onset of arthritis; researcher previously believed there was no way to get it to regrow once gone. The new technique involved slightly injuring joint tissue and then applying stem cells.

And a team working on the Sydney Memory and Ageing Study from the Garvan Institute of Medical Research and the Centre for Healthy Brain Ageing, UNSW Sydney, found [that patients taking metformin as a therapy for type II diabetes experienced less age-related cognitive decline](#) than did those not taking the drug. The study was

carried out over six years.

A group of 239 health experts from around the world signed a letter published in the journal *Clinical Infectious Diseases* arguing that [the standard 1.5-meter social distancing metric was too short](#). They pointed out that multiple studies showed that viruses expelled in breath can travel tens of meters. They concluded by suggesting that people need to be aware of the truth.

And professor Johnjoe McFadden with the University of Surrey proposed [an entirely new theory to explain human consciousness](#). He suggested that electromagnetic energy generated by the brain enables brain matter to create our consciousness and our ability to be aware and think—consciousness, he posited, is the brain's energy field. He noted his theory could possibly be used to develop AI systems with a type of consciousness that would allow them to be aware of their own existence.

Also, a team of researchers working at the Cleveland Clinic found evidence that [melatonin might be a viable treatment option for COVID-19 patients](#). The hormone, which regulates the sleep-wake cycle and is found in many OTC sleep products, reduces symptoms in patients. The team also found that people who were not infected but who were taking melatonin to fall asleep were less likely to become infected if exposed to others who were infected.

And a team at Tel Aviv University found that [the CRISPR/Cas9 gene-editing system could be used to destroy cancer cells](#). They carried out a demonstration of a lipid nanoparticle-based delivery system that targeted metastatic cancer cells and destroyed them via genetically manipulation. They have named the modified system CRISPR-LNPs and note that it works by carrying an RNA messenger that snips the cancer cells' DNA.

A team at the Norwegian University of Science and Technology wondered [why writing by hand makes kids smarter](#). Their experiments with student volunteers writing while wired for EEG monitoring showed their brains were much more active when writing by hand, suggesting more engagement and

thus more learning.

And a team with members from the Hebrew University-Hadassah Medical School, Philipps University Marburg and the Weizmann Institute of Science found that [antioxidant-rich foods like black tea, chocolate and berries may increase the risk for certain cancers](#). Their findings may also explain why colorectal cancer is so much more prevalent than cancers of the neighboring small intestine.

Also, a team working at the University of California San Francisco found that [a drug given to mice reversed age-related cognitive decline within days](#). The drug, called ISRIB, had already been shown in laboratory studies to restore memory function months after traumatic brain injury, to reverse cognitive impairments in Down syndrome, to prevent noise-related hearing loss, to fight certain types of prostate cancer, and even to enhance cognition in healthy animals.

And a team working on the National Health and Nutrition Examination Survey found that [women's expected longevity could be linked to her age at the birth of her last child](#). They found patterns in their database of 1,200 perimenopausal and postmenopausal women of various ethnicities and backgrounds showing that women who gave birth later in life had longer telomeres, which have been linked to longevity.

Also, researchers working at Oregon State University found that [older adults who took a daily multivitamin and mineral supplement with zinc and also high amounts of vitamin C experienced sickness for shorter periods of time and with less severe symptoms than their counterparts in a control group](#). The 12-week study involved 42 healthy people between the ages of 55 and 75 and was designed to measure the impact of such supplements on immune system indicators.

And a team at the University of Alabama at Birmingham's Nutrition Obesity Research Center led by assistant professor Amy Goss [looked into the effect of a low-carb, high-fat diet on older populations](#). They found improvements in body composition, fat distribution and metabolic health in response to an eight-week, very low-carbohydrate

diet that included consuming three eggs a day.

Also, a combined team of researchers from the University of Buffalo and the University of Michigan, found that [frequent cannabis users overestimated their knowledge of cannabinoids](#)—specifically regarding levels of tetrahydrocannabinol and cannabidiol. In a survey they conducted, they found that many non-professionals who claimed to be highly knowledgeable regarding the active ingredients in cannabinoids greatly overestimated the levels was in various strains.

And recently, the AFP newswire reported evidence that [super-spreader events are a key driver in the COVID-19 pandemic](#). After consulting with multiple experts, they found that the SARS-CoV-2 virus does not fan out evenly across the population, but spreads at the extremes in an almost "all or nothing" pattern. More specifically, they found that the majority of people who become infected infect very few people. Instead, people who attend super-spreader events are fueling the pandemic.

Also, a team with members from several institutions in Europe [confirmed a link between Alzheimer's disease and an imbalance in the gut microbiota](#). More specifically, they found that certain bacterial products of the intestinal microbiota are correlated with the quantity of amyloid plaques in the brain, which are believed to be behind the development of Alzheimer's disease.

And finally, a team of researchers at the University of British Columbia's Okanagan campus found that [ketone monoester drinks may be used to control blood sugar levels](#) in people with diabetes and pre-diabetes. These drinks are popular supplements often consumed by people on the low-carbohydrate, ketogenic diet. They tested the idea with 15 volunteers and found that the drinks were able to launch the participants into a sort of pseudo-ketogenic state in which they were better able to control their blood sugar levels with no changes to their insulin.

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