Recombinant antibodies were central in the fight against COVID-19

Recombinant antibodies have numerous applications, such as treatment for infectious diseases, cancer, autoimmune diseases, as well as diagnostic testing for pregnancies and COVID-19. In a recent interview, Daniel Perez-Witzke, PhD, lead scientist of the R&D team at Absolute Antibody Ltd, discusses some of these applications.

First, we need to understand what recombinant antibodies are. Recombinant antibodies are proteins manufactured in a laboratory. They can bind to substances within the body. Daniel Perez-Witzke, PhD, compares them to a screwdriver. Each antibody is specific to a target protein, as each individual screwdriver is specific to a screw. A flat-head screwdriver uses a different screw than that of a crosshead screwdriver, as an antibody for SARS-CoV-2 proteins differs from an antibody for the viruses that cause common cold.

One of the more recent applications is the detection and treatment of COVID-19. To facilitate detection, a nose swab is taken from the patient and is tested by the antibodies. The antibodies recognise the spike protein on viral particles, where they can now be detected. Treatment involves taking the blood of recovered COVID-19 patients, which now has natural antibodies for COVID-19, and giving it to patients. When the antibodies enter the body, they recognise the spike protein of SARS-CoV-2 and neutralize them. Such antibodies can also be produced in the lab recombinantly, hence developing novel treatments for COVID-19.

Perez-Witzke’s company has developed antibody expression platforms that can rapidly produce recombinant antibodies at gram scale making it possible to manufacture research-grade antibodies within a couple of weeks.

Another application of recombinant antibodies is for cancer treatments, including brain, breast, colorectal, head, neck, lung, stomach, chronic lymphocyte leukemia, Hodgkin’s and non-Hodgkin’s lymphoma, and melanoma.

“Generally, these treatments based on recombinant antibodies have been paired with chemotherapy because they can specifically target the cancerous cells resulting in a better improvement of treatment for patients. Another use for them is in the detection of the origin of cancer cells, which helps doctors gauge the location and the quantity of the cancer cells. A third one is detecting the cancer cells and alerting the immune system to attack those cells” adds the scientist.

During a pandemic caused by an infectious agent that rapidly mutates requires a development and manufacture that recognise the different variants of the virus, says Perez-Witzke and thus, protecting patients showing severe symptoms from any new variant of the virus he concludes.

The multilingual brain is a healthier and smarter brain

Until 1998, Liberian-born language teacher, Ziad Youssef Fazah held the Guinness World Record for speaking 58 languages. Today, it is estimated that more than 50% of the world population is bilingual as it is the case of Qatar where most of the population speak at least two languages.

Some have equated the multilingual brain to a traffic signal, switching back and forth between different languages, which accordingly make people smarter according to popular belief.

Being multilingual is linked by some experts to a higher level of competences and to enhance collective intelligence. For example, concepts for which the speakers have a “word” in one of their languages, As for the benefits, these are enormous”, says Andrea Marinri, a cognitive neuroscientist at University of Udine, Italy.

The Neurocognition of Language Lab in Qatar is in fact dedicated to the study of the brain manifestations of the processing of language, with a specific focus on Arabic. It is one of its kind in the world. Its researchers have shown that acquiring and using more than one language leads to some structural brain differences in both grey matter (cortical) and white matter (subcortical) regions that underlie language-related processes.

“These structural changes generally consist of increased thickness and/or volumes of the areas concerned”, explains Professor Ali Idrissi who is head of this lab and a professor of linguistics at the Department of English Literature and Linguistics at Qatar University.

Multilingualism can also delay the symptoms of Alzheimer’s in old multilingual adults compared to their age-matched monolinguals and “ultimately your brain might be protected against age-related decline”, says Idrissi.

Hence, according to experts, everyone in Qatar should remember that it is never too late to learn another language.
Nanotechnology should be taught at schools according to experts

Salma Hamad, International School of London, Qatar

While Qatar thrives to develop a world-class education system, some experts argue that it is important to rethink the curriculum and innovate it in bold ways. One way of doing so, according to Yousuf Zourob, a leading expert at Siemens Energy in Doha, could be to start teaching about nanotechnology at schools.

He points out that today nanotechnology is at the center of present and future developments in practically all areas of engineering and daily life. So, he adds, that we need to include it in the school curriculum.

“Overall, nanoscience and nanotechnology (NST) have been recognized as an emerging technology of the 21st century. The interdisciplinary nature and remarkable applications of NST have prompted science education researchers to recognize its potential in science teaching”, point out Achilleas Mandrakis, Emily Michailidi and Dimitris Stavrou of the University of Crete in a recent study on the teaching of these technologies at primary school.

“Nanotechnology is the ‘control of matter at specific dimensions where unique phenomena enable novel applications’”, he says while explaining how its application can be in new materials, treating cancer, engineering, and energy sources. These technologies are everywhere and are bringing innovation in healthcare and many other areas in which Qatar is looking for success”, says Zourob.

“Nanotechnology is a very promising platform and provides novel and smart solutions to several challenges in medicine, engineering, energy and other fields. Simply, nanotechnology means size matters”, he adds.

However, integrating new technologies into the education system is still challenging. “There is a huge gap between learners at high school and the researchers, between the students at the graduate and post graduate levels in understanding and realizing the concept and the great merits of nanotechnology.”

“Incorporating the basics of nanotechnology at an early stage of education will enhance the learner’s ability to well digest its concepts and build on the information they already received in high school to extract innovative technologies and smart solutions towards several challenges in health, engineering and environmental sciences at their later stages of education”, points out Zourob.

Moreover, including such technology at schools and the early college years will synchronize the education between high schools and colleges, and will construct a bridge between them that allows for smooth transition integration of the concepts and their conversion into a real and possible clinical solution at the final years of high education”, says the Siemens Energy expert who adds that this can help to plant the seeds for Qatar to become a global powerhouse for this technology in the future.

Experts: Depression and anxiety rates among teens have increased during the pandemic

Alina Qaiser, Qatar Academy Doha

Lockdowns, remote learning, and a pandemic of uncertainty during the COVID-19 crisis have increased depression and anxiety among adolescents around the globe according to Healthline Media, a provider of health information headquartered in San Francisco. This institution has observed that people of all ages have endured constraints because of the pandemic.

According to Yolanda Kukuia, a Middle School counsellor in Qatar Academy Doha, “for teens, these constraints have meant months of isolation from friends, remote learning, and the cancellation of social activities like proms, sporting events, concerts and graduations.” Kukuia added, “closer of schools and social distancing have deprived teenagers of psychological support,” and this has resulted in them being at a higher risk of developing depression and anxiety”.

The causes of depression and anxiety in teens are not exactly known as there are a variety of factors may be involved, says Tobias Hauser, a neuroscience researcher at the Max Planck UCL Centre for Computational Psychiatry and Ageing Research.

Experts warn however that imbalances of hormones within the body can trigger depression and anxiety. “When neurotransmitters - the chemicals that carry signals to the brain - are impaired, the body’s nerve systems are altered in a way that produces depression and anxiety”, adds Hauser.

A 17-year-old young adult resident living in Qatar (name withheld) describes the effect the pandemic has had on his activities as a teenager. Before the pandemic, he woke up at 5.30 a.m. sharp and he would depart for school at 6.10 a.m. When he returned, he would spend time with friends. Now live seems to be on pause, he says. “This is typical for youths as they depend on fellowships to oversee anxiety, depression and maintain self-esteem”, notes Kukuia.

Hence, more needs to be done to address these issues and make sure that all young adults recover a sense of normality and healthy mindset in their lives.

In case you are facing some of these issues, please contact Child and Adolescent Mental Health Services (CAMHS).

Email: procurement@nuraffar.com
HMC’s Mental Health Service Number: (+974) 4439 5777

Editorial

The National Vision 2030 intends to transform Qatar into an advanced nation, capable of sustaining its development and providing a high standard of living for all its people for years to come. At the center of this strategy is the aim to transition from a fossil fuel to a knowledge-based economy. This vision contemplates increasing public engagement with science, technology, engineering, and mathematics (STEM) while improving the overall media literacy among all levels.

STEM News is our own way of supporting this goal by making sure that we raise awareness about, and foster engagement with science and technology.

In our first edition, we publish news stories written by 12 to 15-year-old students from different schools in Qatar. They attended workshops and participated in sessions with scientists and other experts. The students did this with the support of their parents, teachers, and schools. The results, as you will see here, are a remarkable and inspiring set of new stories.

This news supplement was made possible thanks to the support of the Qatar National Research Fund and Siemens Energy with the coordination of Northwestern University in Qatar, a Qatar Foundation partner university.

Having said that, the real stars of this initiative are no other than the children themselves and their teachers, all of whom worked arduously over the past few months to learn journalism and produce the STEM News articles while the pandemic was still going on.

They are a testament to the quality of the education system in Qatar and their growing commitment with STEM education at each of the participating schools.

We hope that this endeavor inspires others to launch similar initiatives both here and in other countries and that Qatar continues to lead the way in communicating and popularizing science across society.

The Editors
New sensor technologies will help improve robotic prosthetics in humans

Qatari Fashion technology against vitamin D deficiency

Iris recognition is effective, but still has its limitations

The iris is formed by five distinct layers

1. Anterior border layer (condensation of iris stroma and melanocytes; pigment-containing cells that determine the color of the eye), and is coarsely ribbed with numerous crypts.
2. Stroma, blood vessels nerves, melanocytes and fibrocytes (Substance of the iris).
3. Muscular layer: Dilator and sphincter muscles that determine the pupil size. And under all of that there are two layers of pigmented cells to make the curtain opaque.
Car-T cell therapy against cancer is promising

SARA BOU AKAR
THE LEBANESE SCHOOL OF QATAR

C

himeric antigen receptor T-cells, also known as Car-T cells, are cells that have been genetically engineered to produce an artificial T-cell receptor in a lab for use in immunotherapy to treat cancer. Car-T cell therapy, which is a therapy known for treating cancer, has demonstrated promising results in a range of patients across the globe. In some patients, this can lead to the total elimination of the cancer or a significant improvement. This involves re-engineering a patient’s own T-cells to recognize and eradicate cancer, says Daniel Perez, PhD, a lead scientist of the R&D team at Absolute Antibody Ltd in the United Kingdom.

These T-cells are genetically altered to express artificial receptors which enable them to bind to a specific antigen on the influenza tumor cells and kill them. Scientists might be able to modify the T-cells in a lab and recognize receptors to act upon cancer. Then they reinfuse those T-cells back into the patient by an IV (Intravenous therapy/vaccination).

For Farelo, the efficiency of the vaccines demonstrates promising results in a variety of vaccines have begun to be distributed around the world.

Doctor Mafalda Farelo, a cell biologist with a Ph.D. in virus-host interactions from the University of Surrey in the UK, explains the different types of mechanisms used by these companies to create immunity.

Firstly, she says, the difference between DNA and mRNA. The DNA is the “cookbook”, with our unique genetic code, existent in all our cells, and the mRNA is the “recipe” to produce each protein of our cells, obtained via the DNA. “There are two different methods, but the final goal for all of them is equal, to produce antibodies against the virus.”

The method used by Pfizer and Moderna is a new technology. It consists of introducing the “recipe” on how to make a part of the virus (spike protein), to our immune system. According to Farelo, this “recipe” is called mRNA and arrives in our body surrounded by a circle of fat, so that we can then accept it and start producing the coronavirus spike protein.

After our body produces this protein, a response is triggered, as our immune system recognizes that the protein it had just created does not belong in our genetic code. Our body then begins trying to start producing the coronavirus spike and start producing the coronavirus spike protein.

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The difference between this method and the mRNA method is that this one uses the DNA that codifies the spike protein as an alternative.

Instead of using a bubble of fat, they insert the DNA of the spike protein inside another virus, which is an adenovirus”, she explains.

This virus would normally cause cold-like symptoms, but it is deactivated to reduce its multiplication inside our bodies. “It is just the shell of the virus, the package, so we don’t get infected”. After this adenovirus enters our body, it will release the DNA inside our cells, which will be converted into mRNA and then to the spike protein. From this point, the body’s reaction will be the same as the first method.

For Farelo, the efficiency of the vaccines is related to its method. “It is not easy to compare the vaccines because they are made from different components, the doses they use are also different, and the methods different as well. Efficiency is something that happens in clinical trials, effectiveness is what happens in real life. What we have seen is that the effectiveness results have proved better than the efficiency shown in clinical trials.”

Interns of effectiveness, the “adenovirus” vaccines have a little less percentage of immunity than the mRNA method, but they are still very good results.

Understanding the technology behind Covid-19 vaccines

SOFIA NOGUERA
INTERNATIONAL SCHOOL OF LONDON, QATAR

We have all been facing a global pandemic caused by a virus called SARS CoV-2. More than 150 million people have been infected and over 3 million have died.

Fortunately, there is now light at the end of the tunnel. At the beginning of 2021, a variety of vaccines have begun to be distributed around the world.

As stated by Farelo, there is also another technique. This technique is used by AstraZeneca and Johnson & Johnson, the “adenovirus-method”.

This technique has been used on other older vaccines like polo, flu, and measles. The difference between this method and the mRNA method is that this one uses the DNA that codifies the spike protein as an alternative.

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Regular screening for breast cancer saves lives

ANUSHKA GUDAVALLI
DOHA COLLEGE

Breast cancer is one of the most prevalent types in the world. In 2020, there were roughly 2.3 million diagnosed cases and some 685,000 recorded deaths worldwide.

As with most cancers, the cause is still largely unknown, but research has shown that people can be genetically predisposed to the disease. Genetic factors appear to be involved in only 5-10% of cases. Other factors that increase the risk include ageing, obesity, smoking, air pollution, preservatives, and adulterated foods.

Thankfully, there are several precautionary measures to detect it on at early stage such as undergoing regular breast screenings.

“When a woman turns 45 years old, we recommend regular screenings. The earlier a cancer is found and treated, the better the prognosis”, recommends Jyothi Kini, a breast cancer pathologist and researcher from St. John’s Hospital in Bengaluru, India, who adds that that a “healthy lifestyle may also be beneficial as it strengthens the immune system and has been linked to cancer prevention”.

Experts highlight that the first symptom is a lump on the breast or underarm, which can be identified by a mammogram long before it is felt during a manual exam. Other symptoms include thickening or swelling in any part of the breast, irritation or dimpling of breast skin, redness or flaky skin in the nipple area or breast, pulling in the nipple and nipple discharge other than breast milk, including blood.

Cancers that are still in their initial stages are usually not life-threatening as they have not had time to metastasize and create new tumours. However, “there is no universal answer for treatment and every case will be unique. There are many distinct types of breast cancer and treatment for each of these varies. Depending on the stage and severity of cancer, treatment options will vary”, says Ambika Anand, a breast surgeon from Hamad Medical Corporation in Qatar.

You can help

To help those with cancer, you could donate to the Qatar Cancer Society. Your donation would be valued immensely by patients and researchers alike. https://www.qcs.qa/en/
Obesity among adolescents is a growing concern

LUAIJ AL RAUSH, QATAR ACADEMY DOHA

nactivity among adolescents was becoming very common around the world even before the pandemic. The average young student sits for at least 7.5 hours a day, with little to no physical activity in between according to experts of the World Health Organization (WHO).

In Qatar, the prevalence of being overweight is now above 20 per cent. The highest rate is among boys, according to a paper published by Abdelhamid Kerkadi and other experts in the country. These experts agree that the primary contributors to this disease are inactivity and poor diet.

Indeed, a University College London study found that less than 30% of adolescents meet the aerobic exercise guidelines for youths, putting them at major risk for developing obesity. Most researchers agree that obesity is a leading factor of high mortality rates globally and is one of the main contributors to the development of type 2 diabetes, obesity, various cancers, and lipid disorders.

To counter obesity, experts recommend that adolescents participate in one hour of vigorous physical activity daily, while taking an adequate number of steps. This can be done by taking breaks to go on walks in between study sessions, or by joining sports teams. Walking or biking to destinations instead of driving is also advised, to hit the recommended exercise guidelines for the day. All in all, any physical activity is valid, as long as it is enjoyable and convenient to you!

One out of every five people in the world have no access to electricity

Mohsin said that about 1.3 billions of the world’s population, concentrated in South Asia and Africa, lack electricity despite decades of international development. In these places, he adds, residents rely on “conventional methods” for activities that require electricity, such as using candles for illumination.

That is the experience of Priti Schunaz, 32, an expatriate living in Qatar. She confirms the lack of electricity in the southern part of India, is something that “has had an impact on many lives.” Many of us struggle to cook and complete daily tasks back home because we cannot rely on the dependability of electricity,” she said.

Schunaz points out that the energy in her house in India “comes and goes.” When the power goes off, her family relies on traditional methods such as “using candles, cooking on wood, and hand-washing clothes.”

However, traditional methods of using energy can have a detrimental effect on the environment, according to Mohsin as they generate particulate matter, exposure to which causes heart and lung conditions that are harmful to human health and this has resulted in concern among inhabitants in the planet.

Society should awake to the sleep deprivation problem

TIMERJEEP KAI MALHI
DOHA COLLEGE

he symptoms of sleep deprivation are normally quite apparent, such as deteriorating memory, lack of energy, diminished attention span, hindered thinking and mood changes. Now, on to understanding why sleep is so important for our bodies.

Sleep deprivation, unlike sleep deficiency, is usually caused by voluntary choices that decrease available time to sleep. For example, a person who stays up late surfing the internet on their phone is likely to be acutely sleep-deprived.

“To understand the consequences of sleep deprivation, you must first understand the importance of sleep,” says Anildev Singh Malhi, a psychiatrist working at the Ministry of Health in Malaysia.

Getting enough sleep helps to improve neural connections and remove toxins from the brain, amongst other vital purposes. In turn, sleep deprivation reduces neural connections, which affects memory, concentration and creativity. In terms of mood changes, he further states, “it is difficult to pinpoint an exact mechanism that relates sleep deprivation with mood changes. However, poor sleep increases the production of cortisol hormones in the body, which leads to stress. Prolonged stress will affect a person’s mood”, the expert adds.

Overall, sleep deprivation increases the risk of heart disease, diabetes, and high blood pressure. It also affects balance and weakens the immune system. According to Melinder Kaur Dhillon a family medicine specialist, this occurs because “the release of cortisol from the adrenal glands results in the elevation of blood pressure, increasing the afterload on the heart, hence the risk of heart disease”.

The expert adds that the prolonged period of cortisol secretion causes the breakdown of blood sugar in the liver, which can lead to eventual metabolic disturbance and diabetes. “Cortisol, a chemical otherwise released during stress, results in the release of inflammatory markers and cytokines (proteins important in cell signaling), further diminishing our immune response or immunity”, she says while stating that “these chemical changes happening in the body can affect the neurotransmitters, which are chemicals in our brains, causing imbalance, anxiety and depression.”

More awareness of oral hygiene in MENA is needed

ALINA QAISER
QATAR ACADEMY DOHA

About one out of every five people living in the world do not have access to electricity, according to Dr. Anto Mohsin, an electrification expert and Assistant Professor at Northwestern University in Qatar.

Mohsin said that about 1.3 billions of the world’s population, concentrated in South Asia and Africa, lack electricity despite decades of international development. In these places, health of individuals such as brain or heart infections.
History shows that collaboration is key for MENA’s space exploration

What history shows is that Qatar 'should consider joint projects with other nations in the Middle East and North Africa' (MENA) and perhaps form an Arab equivalent of the European Space Agency, which is a collaboration of European countries.

One example of what collaboration can do is the Qatar Exoplanet Survey. This is the 'most important milestone in Qatar's astronomy journey over the past century has been the establishment of the Qatar Exoplanet Survey (QES)', states Dr. Jörg Matthias Determann who teaches and researches science history in the Arab world at the Virginia Commonwealth University in Qatar.

Since its inception in 2010, the QES has discovered no fewer than ten exoplanets - planets outside our own solar system - of which four are in our vast neighbouring galaxy of Andromeda.

NERAHI OSSEI
DOHA COLLEGE

The race to find life on Mars

The continual exploration of Mars has led to the discovery of basic ingredients for life over the years, according to experts at the NASA Science Mars Exploration Program, who said that one day we may establish if life ever existed there. Curiosity, a Mars rover equipped with more than 15 cameras and specialized tools, has aided NASA in several initiatives such as drilling holes for signs of life. Most recently, Ingenuity, a small robotic helicopter, and many man-made machines have attempted (and in some cases, succeeded) at making new, groundbreaking discoveries.

SHOUG KHOZESTANI
QATAR ACADEMY DOHA

“There has never been any solid evidence of life on Mars,” says Noora Al Saeed, a specialist in the field of Planetary Sciences. “As a result of water that once existed on Mars, there may have once been microbial life. However, that was billions of years ago, and it is highly unlikely that life exists there at the moment,” she stated.

So far, Curiosity has found nitrogen, oxygen, phosphorus and carbon - all of which are organic materials that make for ingredients necessary for life. Of course, this is not a direct sign of life, but it is an indicator of it.

From Space to face:
How LED lights connected space exploration and beauty

Who knew that space exploration and beauty treatments could ever be linked? In the never-ending quest to make space habitable for humans, scientists have developed a way to improve our lives down here on Earth by using light-emitting diode or LED.

LED lights are in regular use nowadays for a skincare treatment and therapy as it instigates a natural biochemical reaction in the skin that’s surprisingly similar to photosynthesis in plants.

The skin cells absorb the light from the LEDs and use it to strengthen the mitochondria in them, boosting energy production. The additional energy is used to repair damage, rejuvenate cells, and kill bacteria. Studies on the low-level light therapy (LLLT) have been revealed as a potential means to improve wound healing according to Hoon Chung from the Wellman Center for Photomedicine, Massachusetts General Hospital in Boston, USA.

However, it was NASA that first experimented with using LED lights to grow plants in space back in the 1990s. The idea was that the light from the LEDs would be used as a replacement for the sun in the role of photosynthesis, enabling the growth of plants without access to sunlight.

Eventually, LED lights were also studied for their potential use in medicine, as a treatment for the muscle atrophy and bone density issues caused by weightlessness during space travel.

For Qatar-based beauty specialist Margaret Bukola, the use of LED can improve skin tone and smoothing out wrinkles. She highlights its potential benefits of something that was originally meant for space.

SHARON ADENIYI
DOHA COLLEGE

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For Qatar-based beauty specialist Margaret Bukola, the use of LED can improve skin tone and smoothing out wrinkles. She highlights its potential benefits of something that was originally meant for space.
Hawksbill turtle nests on human-made island in Qatar

A Hawksbill turtle has recently nested on a human-made island off the coast of Qatar. The sighting is very rare as this species, belonging to the family Cheloniidae and known scientifically as Eretmochelys imbricata, is a critically endangered species.

However, for Katie Reeves, a marine scientist who has lived in Qatar for the past 13 years, this is not news. As a senior environmental and sustainability advisor in Qatar, she has been working on the Hawksbill turtle nest monitoring project, a unique initiative in this country to help preserve them and grow their numbers.

“One of my colleagues sent me a video of a female turtle tracks. I checked with a global turtle expert, and he confirmed that a female has nested on the island. We’re going to go back-to-back to the island to mark the nest and keep monitoring it to see if the eggs hatch,” highlights the marine specialist.

“There are around 25,000 female Hawksbill turtles nesting around the world. They are critically endangered, so every nest counts. They live in tropical oceans where they feed off sea sponges. They also eat anemones and jellyfish, which can eat thanks to their very sharp, pointed beaks and powerful jaws”, explains Reeves.

In this sense, Qatar has been at the forefront having built a female Hawksbill turtle nesting site on a human-made island. The country has been assessing the numbers of hawksbill turtles annually and their places of spread around the Qatari peninsula tracking them with satellite tracking devices, says Dr. Hamad Al-Kawari, head of the Environmental Science Centre (ESC) at Qatar University.

According to the experts, people in Qatar can do a lot to help save the Hawksbill turtles by reducing marine litter and using re-useable water bottles and shopping bags, says Reeves, who adds that it is also important to fill holes and knock down sandcastles once you leave the beach.

Oysters, mussels, and starfish are struggling to survive

As humans generate more carbon dioxide, emissions of greenhouse gasses go up. However, from 70% of the carbon dioxide that is released into the atmosphere, 30% is absorbed into the ocean. When H₂O and CO₂ mix, they form an acid called carbonic acid (H₂CO₃). This creates carbonic acid in the sea water, which makes life very hard for the sea creatures.

The US-based organization, Union of Concerned Scientists, has warned that carbon dioxide pollution is changing the ocean's chemistry, slowing its ability to uptake CO₂, making it more acidic, and harming shellfish and other marine life we depend on. The organization highlights that between 2008-2017, humans dumped into the atmosphere about 40 gigatons of heat-trapping gases each year from the burning of fossil fuels and land-use change or the equivalent to 252 million blue whales.

According to the ‘Ocean Acidification Report’, oysters, mussels, urchins, and starfish are having a hard time building their shells in more acidic waters, just as how the corals are suffering. These creatures build their shells using high-magnesium calcite, which is a type of calcium carbonate that dissolves even more quickly with the carbonic acid, leaving them vulnerable to be crushed or eaten before they can fully develop.

According to Dr. Anto Mohsin of Northwestern University in Qatar, “the sea absorbs carbon dioxide into the water, making the sea more acidic than usual. Coral reefs are slowly starting to die and many fish and starfish that depend on coral reefs will die too.”

The increase of carbonic acid in waters will also disbalance the natural food chain of the animals and the natural ecosystem of the sea.

More than social media, health communication needs a strategy

While in the past health communication professionals made use of traditional mass communication media to raise awareness in key areas, today the public is fragmented and atomized and mostly exposed to digital social media instead. In the case of the MENA region, social media use has become prevalent according to the longitudinal study Media in The Middle East that is conducted by Northwestern University in Qatar.

This new context has obliged health communicators to change strategies. For Susan Dun, a specialist in health communication at Northwestern University in Qatar, “social media itself doesn’t actually deliver a preventative health strategy. It’s just a tool. What really determines whether a health strategy is effective is, firstly, the strategy itself. What we need is a good strategy. Second, it’s a question of picking the right medium to target a specific audience. There is an intersection between the audience, medium and type of message.”

This is particularly important as COVID-19 has created restricted mobility and increase the use of screens and left people perplexed in effectively going through the content offered. Indeed, the pandemic has created additional stress and increasingly sedentary lifestyle in the community in Qatar says Dr Jitendra Mishra, a Cardiologist at Al Ahi Hospital.

Overall, “a mutual interface between local health professionals, influencers and journalists may help fill up the lacunae of an effective health strategy,” adds Jitendra Mishra.

However, the approach to social media requires a different communication strategy. “Linking the message to the mindset of people, giving them a sense of control over themselves, taking the audience into account – could be really effective”, says Dun.

Also, it is not only about news media but also using entertainment media in the communication mix. “There is a type of media called EDU-entertainment. Entertainment media don’t have the responsibility to do all this but sometimes the writers of sitcoms and other programs are more socially minded and use them in this way. Children’s programs and publicly funded programs have rules like this in some countries but there is a whole area of health communication in EDU-entertainment that blends educative and entertainment content. Things like teaching grammar and manners are often done in this way. That’s where you would look to find the intersection between those two areas”, she adds.

“Most important consideration is the perspective of the audience. The best health communication strategies start by talking and knowing the audience. This is the biggest hurdle. Secondly, we need to understand how the message works”, points out Dun.
Innovations in LNG have made Qatar a global player

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Growing energy demands putting pressures upon the environment have brought shale oil production at the centre stage, which is an unconventional oil production method in which hydrocarbons are extracted from tight shale rock and brought to the surface. Unlike conventional oil production from permeable and porous reservoirs, shale oil does not freely flow under normal conditions due to the very low permeability of the shale that holds the oil.

"To produce a hydrocarbon from any lithology of a rock, it requires a permeability so that the liquid can flow through it. However, by nature shale is made up of flaky minerals so it does not contain the permeability needed which is why you have to create the permeability by fracturing or high pressure hydrofracturing", said M. Panggabean, a geologist at a major oil company in Qatar.

"Once the permeability is created, the gas starts flowing through the fractures and you can take out the surface from the products. Shale oil is heated enough to break down and melt organic compounds like kerogen where it comes out as a liquid or gaseous form. These liquids are similar to the liquid and gaseous hydrocarbons found in conventional petroleum", he adds.

This geologist explains that "shale oil extraction happens in two ways: shale rocks are mined out and broken into smaller pieces and transported to the processing power plant, heated at 500 degrees Celsius /930 degrees Fahrenheit. Due to the high heat, oil comes out as steam from these rocks. The second process where all shale is broken by explosion. The rock is then heated with techniques like electrical heating which brings out kerogen".

However, critics pose questions regarding environmental management issues, including waste disposal, extensive water use, wastewater management, and air pollution. This is because mining for shale oil can have damaging effects on the environment too. When shale oil is combusted (heated), it releases carbon dioxide into the atmosphere. It can also contaminate groundwater.

What is natural gas?

Natural gas is mainly composed of methane. It is formed through the decay of organic material that has been exposed to intense pressure and heat over millions of years. Methane is an extremely important resource the energy produced by it is used to power numerous devices. This plentiful gas is also the cleanest burning fossil fuel as it does not emit as much greenhouse gases as other fossil fuels do", said Zourob.

"Methane exists in the gaseous state at room temperature its particles are very far apart. As a result, only a few methane particles can fit into a large container. This creates an issue, as some natural gas resources are in remote locations. Transporting large amounts of gas (methane) in a large container can be costly and unviable", he adds.