

QATAR BIOMEDICAL RESEARCH INSTITUTE

QBRI
معهد قطر لبحوث الطب الحيوي
Qatar Biomedical Research Institute
جامعة حمد بن خليفة
HAMAD BIN KHALIFA UNIVERSITY



A LEADING RESEARCH
INSTITUTE UNDER HAMAD
BIN KHALIFA UNIVERSITY



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A tiny glimpse
into the work
of QBRI and
the effect our
research can
have on the
world



Qatar Biomedical Research Institute (QBRI) is a national biomedical research institute under Hamad Bin Khalifa University. Though we established in 2012, QBRI has only been operating out of its current labs since 2017, making us relatively young in the biomedical field. But now that we've gained footing as a leading research institution, it's time to highlight some of what we have achieved so far.

QBRI is home to three research centers focusing on diabetes, neurological disorders, and cancer and immunity. Each of these areas greatly affects the world at large, and the local population. Our hope is to diagnose disease earlier so that there is greater opportunity for intervention and higher quality of life. Through innovations in prevention, diagnosis, and treatment, we hope to improve the effectiveness of health care for local, regional, and global populations, with the ultimate goal of achieving precision medicine.

Investing in QBRI is an investment in both our local Qatari population and that of the greater biomedical field. The institute currently has 89 staff members, including 71 researchers, making it the single most prominent biomedical research institute in the region. We are continuously growing, in terms of researchers; alliances with national hospitals, international institutions, and pharmaceutical and biotech industry; external research funding, publications, and all quantifiable metrics. All forms of support we receive allow Qatar to capitalize on the latest scientific advances, address immediate health care challenges, and develop new treatments and applications that will improve the quality of life and effectiveness of health care.

QBRI also prioritizes education and training in the form of research fellowships, training programs, mentorships, summer programs, and internships. We consider it part of our legacy to train and nurture Qatar's next generation of biomedical researchers. Additionally, we educate the local community about diseases through informational leaflets, symposiums, and more. We hope this magazine will give you a tiny glimpse into the work of QBRI and the effect our research can have on the world.

Please enjoy our first issue.

Sincerely,

Dr. Omar El-Agnaf

**QBRI IS HOME TO
THREE RESEARCH
CENTERS FOCUSING
ON DIABETES,
NEUROLOGICAL
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QATAR BIOMEDICAL RESEARCH INSTITUTE

DIABETES RESEARCH

One of three research centers at QBRI, the Diabetes Research Center (DRC) works to improve prevention, reversal, and treatment of diabetes and related complications and comorbidities. Its work contributes to the Qatar national diabetes research strategy, and health priorities research programs. Though diabetes remains a major healthcare challenge globally, the importance of studying diabetes in Qatar cannot be understated, as the disease affects Qatar at roughly twice the global average. "Qatar is one of the countries with the highest prevalence of type 2 diabetes," says DRC Director Dr. Paul Thornalley. "About 17% of the population in Qatar has diabetes and 90% of that is type 2. It is a major health burden on Qatar."

As Director of the DRC, Dr. Thornalley leads five teams tasked with research in three areas: stem cell and beta-cell biology, prevention and reversal of type 2 diabetes, and studying biomarkers of prediabetes, diabetes, and diabetic vascular complications and comorbidities. Ultimately, the DRC's goal is to identify new biomarkers, therapeutic targets, and treatment modalities through the use of state-of-the-art technologies.

In addition to those who already have diabetes and those at risk of developing it, there are also the complications of diabetes to consider such as damage to the kidney, retina, and peripheral nerves which affect roughly 30–40% of patients with diabetes.

To help further combat this major health concern, the DRC works in collaboration with national and

international partners, such as Sidra Medicine, Hamad Medical Corporation, Weill Cornell Medicine–Qatar, Qatar University and notably Harvard Stem Cell Research Institute (HSCI). The QBRI's partnership with HSCI is a multi-faceted, five-year training and research program that involves training, education, and research projects in the area of using stem cells for diabetes.

DRC scientist, Dr. Essam Abdelalim, leads the stem cell research group for in vitro modelling and cell therapy of diabetes. "We are focused on using pluripotent stem cells for two main goals: to understand the genetic defects associated with different forms of diabetes and to generate insulin-secreting beta cells for cell therapy," says Dr. Abdelalim.



"Diabetes is a high priority for national health in Qatar and likely will be for some time until we can make major improvements to lift the burden of diabetes in Qatari people."

- Dr. Thornalley



**The Diabetes
Research Center
promotes innovative
research on type 1
and type 2 diabetes
and related metabolic
disorders**

A key driver of the development of prediabetes and type 2 diabetes is being overweight and obese, something the DRC is attempting to address through studies on a dietary supplement to help prevent type 2 diabetes by correcting insulin resistance. “The main driver for development of type 2 diabetes is decreased responsiveness to insulin by the liver, muscle and adipose tissue, and that’s associated with a very high calorie diet and a low level of physical activity,” says Dr. Thornalley. “It’s quite challenging to prevent type 2 diabetes, so we’re intensifying our diabetes prevention and reversal program nationwide with strategies to improve diet and increase physical activity and new approaches to reverse type 2 diabetes in the early years of the disease.” A new strategy is to focus on dietary supplements that can correct insulin resistance. The DRC is investigating a new supplement that corrected insulin resistance in overweight and obese subjects in clinical trial. It is a possible candidate for helping to prevent and reverse type 2 diabetes in the future.

“Diabetes is a high priority for national health in Qatar and likely will be for some time until we can make major improvements to lift the burden of diabetes in Qatari people,” says Dr. Thornalley. “Hopefully, we’re making advances and will work toward this in the near future.”





“WE ARE FOCUSED

on using pluripotent stem cells for two main goals: to understand the genetic defects associated with different forms of diabetes and to generate insulin-secreting beta cells for cell therapy.”

- Dr. Abdelalim



QATAR BIOMEDICAL RESEARCH INSTITUTE AUTISM RESEARCH

The Neurological Disorders Research Center (NDRC), one of three research centers at Qatar Biomedical Research Institute, researches neurodevelopmental and neurodegenerative disorders of high prevalence in Qatar and the pan-Arab region. This includes epilepsy, Alzheimer's, and Parkinson's, with particular emphasis on Autism Spectrum Disorders (ASD). Dr. Lawrence Stanton, the Center's Director, leads a team of seven principal investigators including an epidemiologist, a human geneticist, cell biologists, molecular biologists, and an electrophysiologist, all working collectively to understand autism from both a clinical and molecular perspective with the aim of improving diagnosis, intervention, and treatment.



THE NEUROLOGICAL DISORDERS RESEARCH CENTER FOCUSES ON RESEARCH IN NEUROLOGICAL DISORDERS OF HIGH PREVALENCE TO QATAR AND PAN-ARABIC REGION

“Our interdisciplinary research program allows each of us to bring our specialties together and tackle ASD in a more comprehensive way. Members of the NDRC were recruited from international sources—all with established capabilities—to focus on understanding more about autism.”

- Dr. Stanton

“Our interdisciplinary research program allows each of us to bring our specialties together and tackle ASD in a more comprehensive way,” says Dr. Stanton, who has more than 30 years of research experience in industry and academia. “Members of the NDRC were recruited from international sources—all with established capabilities—to focus on understanding more about autism.”

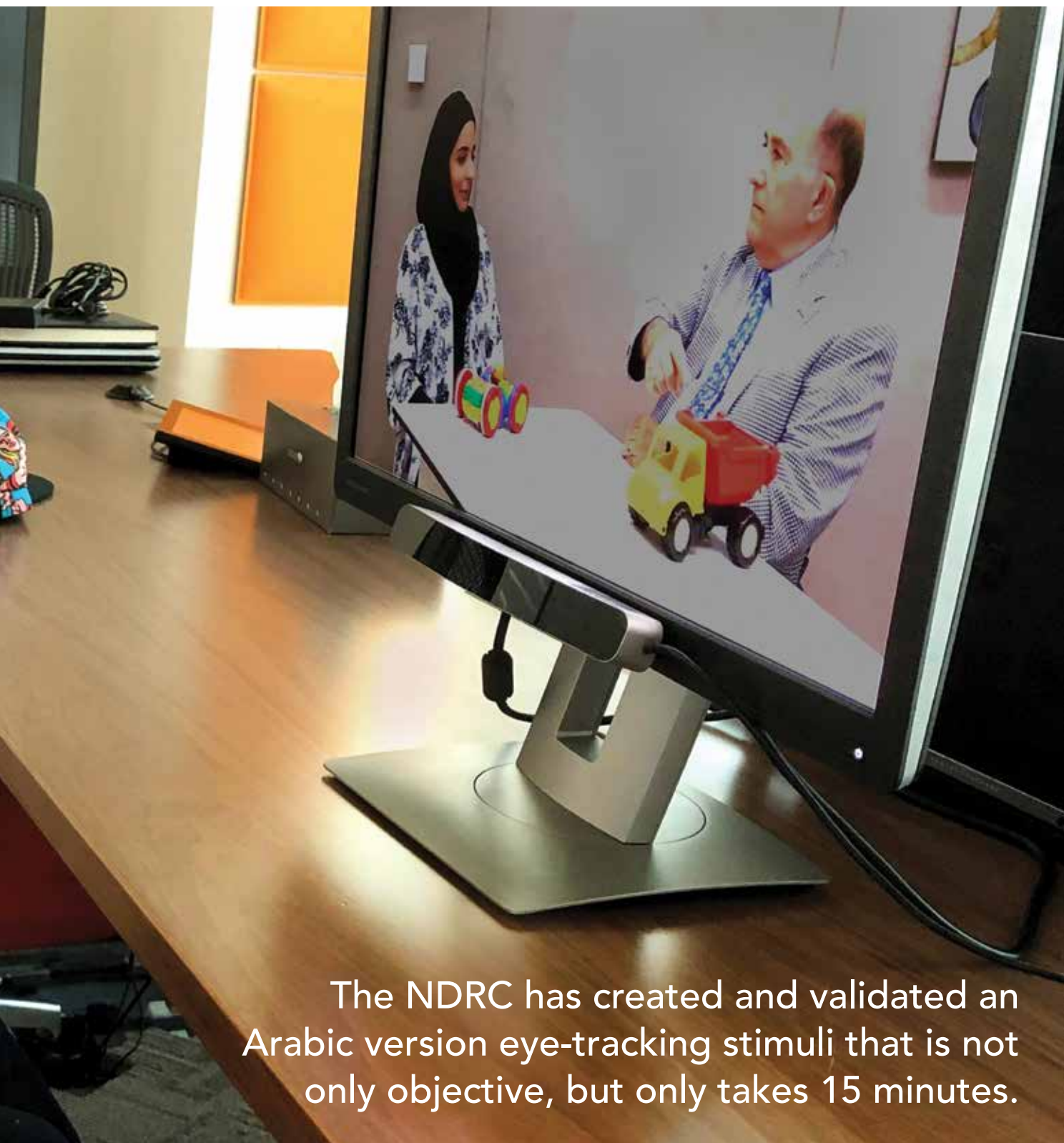
The NDRC’s focus on autism results from the prevalence of this particular disorder in Qatar. Prior to joining QBRI, Senior Scientist Dr. Fouad Alshaban, who brings years of experience working as a clinician and scientist, led a project to estimate the prevalence of autism in Qatar and create a registry for those affected. Prior to this research, it was estimated that 1 in 5,000 individuals in Qatar had autism; through this research, it was determined that the prevalence is actually 1 in 87 (1.14%). It took roughly seven years to screen students between the ages of 5–12 at 93 primary schools for this study. Working in collaboration with the Cleveland Clinic and Oregon Health & Science University, researchers were able to create a database for 1,300 individuals with autism at the project’s end in 2017.

Since then, Dr. Alshaban has worked with fellow epidemiologists on the second part of the project: facilitating the diagnosis of autism. Currently, diagnosis relies heavily on subjective tests, but working with the Cleveland Clinic, the NDRC has created and validated an Arabic version eye-tracking stimuli that is not only objective, but only takes 15 minutes. “We were successful in validating that stimuli, and now we’re working to introduce it into a software with English parts so it will be available for clinics everywhere,” says Dr. Alshaban. “We want to make the diagnosis available for anyone.”



Dr. Alshaban and his colleagues at QBRI recruit families with children with ASD to enroll in consented Genetics and Genomics studies; the genetics of these subjects are then used by the NDRC to understand autism at the molecular level which helps identify biomarkers of the disorder. These genetics studies are in partnership with the Qatar Genome Program, a major effort in Qatar to sequence thousands of Qatari citizens which the NDRC is building on with its sequenced genomes of affected individuals.

Stem cell research is one of the cutting-edge technologies being used in the study of ASD. Dr. Stanton's stem cell project takes blood cells from subjects with ASD and reprograms them into stem cells which can then be converted into neurons. "Without dissecting a person's brain, we can make neurons from subjects who have the exact genetic background that correlates with that donor," says Dr. Stanton. "Essentially, what we do is generate neurons in the lab that have the genetics underlying ASD and use them



The NDRC has created and validated an Arabic version eye-tracking stimuli that is not only objective, but only takes 15 minutes.

as tools to study the molecular details to see what is different between the neurons of a healthy subject and an ASD subject.”

While ASD affects populations globally, it is the priority of the NDRC to understand what is unique about the local population with autism. “We emphasize working with the local population to understand the genetic basis and unique molecular characteristics of ASD in this region,” says Dr. Stanton. “Our goal as an institute is to

be the preeminent leader in understanding autism for not just Qatar, but also the region.”

The NDRC has a well-defined plan for collaboration in relation to ASD research, which includes local entities such as Shafallah Center, the Child Development Center at Hamad Medical Corporation, and Primary Health Care Corporation.

QATAR BIOMEDICAL RESEARCH INSTITUTE BREAST CANCER RESEARCH

The Translational Cancer and Immunity Center's (TCIC) research priorities are centralized around cancer immunology and immunotherapy, and cancer biomarkers and therapy with the aim to achieve a better understanding of the cellular and molecular bases of cancer initiation and progression. The center's main focus is breast cancer research, for which an interdisciplinary program was formed to utilize the many resources throughout QBRI as a whole. In addition to studying cancer issues affecting Qatar and the Arab region, the TCIC also conducts research in immunity and infectious diseases.

Scientists within the TCIC each conduct their own projects on issues directly affecting Qatar. Dr. Fares Al-Ejeh, a translational cancer researcher relatively new to QBRI, studies predictive and prognostic biomarkers to predict whether a patient is going to respond to the standard of care they are given. This helps to optimize treatment so that patients aren't wasting time on treatments that won't work, a field known as "precision medicine." Before starting at QBRI in 2020, Dr. Al-Ejeh headed a lab in Australia where he studied similar subjects, but in the local population. "What I'm doing differently here is looking at the local population of cancer patients because they're different," he says. "Some differences are genetic, some are environmental. While tumors are tumors, some of them have different molecular structure; we're trying to use our understanding of that molecular structure to predict the right treatment."

Identifying novel biomarkers and therapeutic targets for breast cancer is the focus of Dr. Nehad Alajez's research at TCIC. "These biomarkers can be used either as a diagnostic, prognostic, or predictive so basically this can help us determine how the patient is going to respond to treatment, or even as therapeutic targets," says Dr. Alajez. A couple of elements are involved in this research, including studying the changes in protein-coding as well as non-coding RNAs in





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breast cancer patients which could enable researchers to come up with a more reliable diagnostic and prognostic tool for the disease and to identify novel therapeutic targets. Dr. Alajez's team also looks at circulation with the aim of finding a noninvasive blood-based biomarker for breast cancer.

"Think of the resources being spent on treating this disease; so what if we can detect the disease at earlier stages to not only minimize the suffering of the patient who will undergo treatment that can be avoided with early detection, but also save resources for treating advanced stage disease?" says Dr. Alajez. "If we can catch it early enough, we can minimize the need for advanced, costly therapeutic interventions." Additionally, Dr. Alajez is looking into potential biomarkers which can predict a breast cancer patient's response to the treatment. Therefore, the timely identification of patients who will not benefit from chemotherapy, for instance, is very critical to avoid exposure of this group of patients to toxic medications and unnecessary delays in exploring other therapeutic options.

Dr. Mariam Al-Muftah is another researcher at the



TCIC with background and expertise in cancer gene and immunotherapy. Since joining QBRI in 2019, her own research team has been involved in identifying, and subsequently validating, gene/immune signatures as biomarkers, alongside other well-established biomarkers, in order to classify patients' eligibility in terms of deriving benefit from cancer immunotherapy, with particular focus on Triple Negative Breast Cancer (TNBC).

Dr. Al-Muftah says, "For precision medicine to be implemented, we need specific biomarkers to identify which patients are eligible for which therapy in order to personalize the treatment for maximum benefit and minimal side effects." Dr. Al-Muftah is currently seeking collaboration with the governmental health care system in Qatar with the hope of identifying predictive biomarkers in the local population.

As a scientist and a Qatari, Dr. Al-Muftah is very passionate about her research to align with Qatar Foundation's mandate on precision medicine, with the hope of supporting the healthcare system in Qatar and impacting patients' survival. Breast cancer is one of the most diagnosed types of cancer in the region, accounting for roughly 30% of all cancer cases in Qatar. "To support the healthcare system in Qatar as it becomes a center of excellence with personalized treatment for patients, we need to study the genetics of the local population as most, if not all, global research is largely based on the Caucasian population," says Dr. Al-Muftah.

"Breast cancer is a major health problem across the world, and it remains the most commonly diagnosed type of cancer among women," says Dr. Julie Decock, scientist at QBRI. Dr. Decock heads a research team at the TCIC where she is also involved in an interdisciplinary research project on genetic determinants of non-BRCA linked familial breast cancer and is the scientific coordinator of the IDRP on COVID-19. She joined QBRI in 2013 and established a research program focused on breast cancer—in particular, TNBC which constitutes 15-20% of all

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breast cancer cases. Dr. Decock’s research efforts are centralized around two research areas: tumor target discovery and tumor immunology to advance the identification of targets that can hit and kill tumor cells more specifically and overcome immunosuppression.

Clinical outcome following cancer treatment depends on a variety of factors including tumor target specificity and treatment resistance. In the area of tumor target discovery, Dr. Decock and her team aim to identify novel, highly tumor-specific targets that can be used for immunotherapy or combinatorial treatment of breast cancer. As the field of tumor immunology has evolved, it has become clear that studying the tumor

environment can enhance our understanding of which key players and factors contribute to treatment resistance. Identifying tumor targets that can help patients to overcome immunosuppression will ultimately help to improve the survival of breast cancer patients—an important development since some tumor types, including some breast tumors, don’t respond well to immunotherapy. “Traditionally, cancer treatment was focused on targeting tumor cells, however, we also have to consider the environment of tumors in our ongoing search for innovative and effective treatments of cancer,” says Dr. Decock.

Interdisciplinary Research Programs

Within the three research centers of QBRI are researchers of all kinds: biochemists, neurologists, MDs, geneticists, research fellows, all with their own areas of expertise and skill sets. To best utilize this diversity of minds, QBRI has established four interdisciplinary research programs (IDRPs): breast cancer, infectious diseases, diabetes, and autism. By encouraging researchers to tackle each of these areas across two or more of QBRI's research centers and to work together across disciplines, the interdisciplinary approach is expected to generate innovative, problem-solving strategies that could not be created within individual disciplines. This research can also extend to national and international partnerships, some of which QBRI is already in consultation with regarding significant projects. Hamad Medical Corporation (HMC) is considered as a key partner in all QBRI's IDRPs.

Dr. Nasser Zawia is the Research Director of QBRI and is tasked with overseeing all research activities, developing strategies, and performing oversight. Though Dr. Zawia has only been at QBRI for a few months, he has seen firsthand the benefits of interdisciplinary research. At the University of Rhode Island, he established the first interdisciplinary neuroscience program. "I'm used to seeing people from very distant disciplines collaborating together," says Dr. Zawia. "Interdisciplinary research, to me, is something to advocate and promote so I was very happy when I joined QBRI and saw that they had IDRPs."

Though all types of research could benefit from the interdisciplinary method, the four subjects chosen for IDRPs at QBRI were chosen for the prevalence of each disease in Qatar and alignment with national health priorities.

Within each of the IDRPs is a specific research project, aligning the interests of researchers from all three research centers: the Neurological Disorders Research Center (NDRC), Diabetes Research Center (DRC), and Translational Cancer and Immunity Center (TCIC). For the Autism IDRP, this is identifying potential biomarkers for Autism Spectrum Disorder (ASD). The Diabetes IDRP aims to identify blood-based biomarkers in patients with Type 2 diabetes with and without co-morbidities of cardiovascular disease (CVD), stroke, and dementia and to develop biomarker-based algorithms for the early-stage comorbidity diagnosis. The Breast Cancer IDRP focuses on identifying novel diagnostic and predictive biomarkers for breast cancer in Qatar. And the Infectious Disease IDRP's focus on integrative, translational research against COVID-19.

One example of how combining disciplines can result in medical advances is in the case of diabetes. The diabetes IDRP has people from neurological disorders in order to look at some of the complications from diabetes

like dementia and other mental side effects. "When you combine the expertise of people from other areas, the combined effects are going to be better than everyone working in their own area," says Dr. Zawia.

Research Grant Manager, Dr. Mahmoud Naas, is also highly involved with the IDRPs at QBRI. In regard to the benefit of interdisciplinary research, Dr. Naas says, "We have people with expertise in every center, working on their own projects. In the IDRP projects, you find that expertise being utilized in a wider sense."

Dr. Nasser agrees, saying "Interdisciplinary research brings people from different areas to work together, and that's where discovery can be made. When you're always talking to people in your own discipline, the conversation is very limited, and you all think alike. But when you talk to people in other disciplines and plan projects together, you bring in a new perspective. Approaching a problem from different angles can be key to making discoveries."

An IDRP was created at QBRI in reaction to the COVID-19 crisis, which required researchers from many disciplines to come together. Some of those people included researchers from the cancer center because they understand infections and immunity work and people in the neurological disorders center who are experts on antibodies and antibody generation. By facing this new challenge from the perspective of multiple disciplines, QBRI was able to study this new disease from different angles and brainstorm more solutions.

Within its IDRP's that are based on biomarker discovery, using clinical samples from the population of Qatar, QBRI aims for achieving early diagnosis and personalized medicine.

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Qatar Biomedical Research Institute

Overview

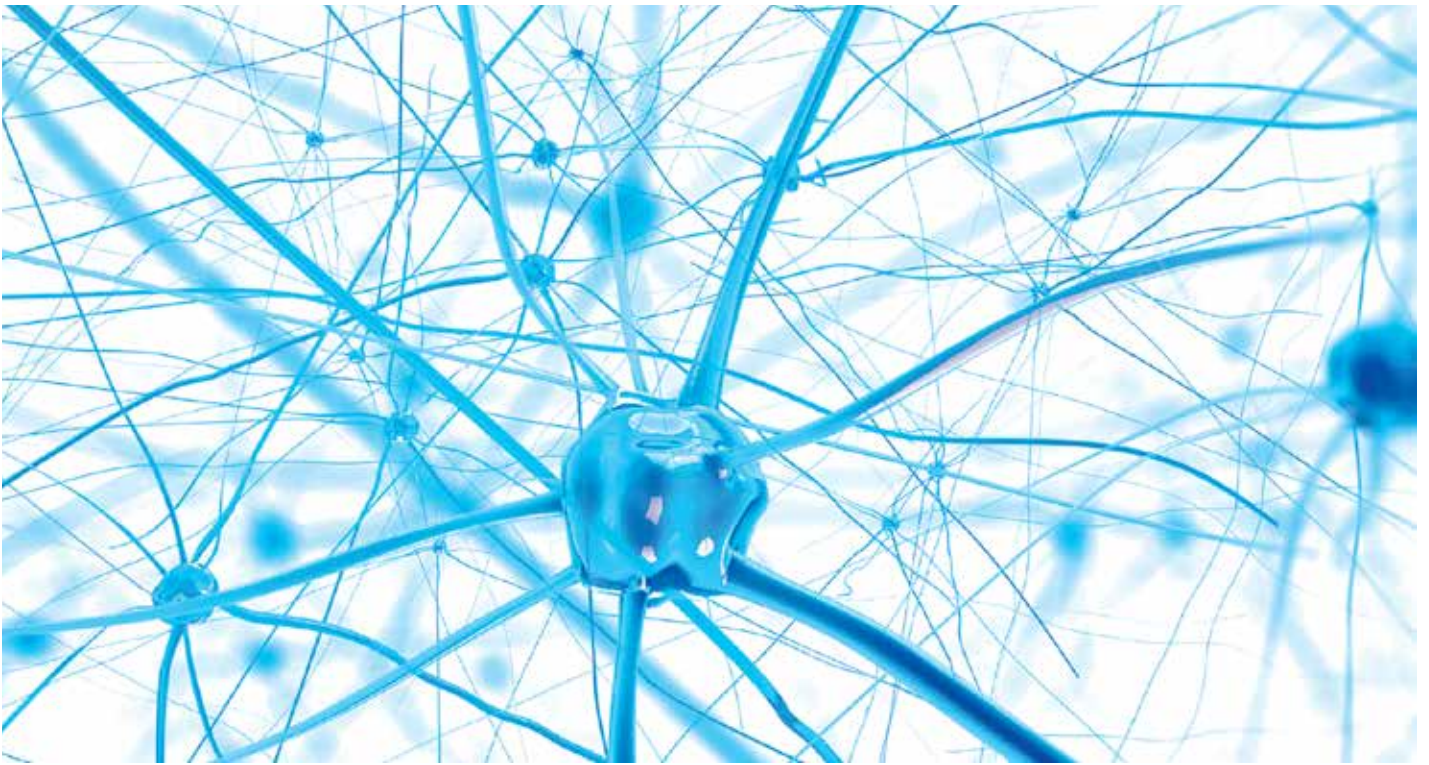


QABY

AIMING FOR EARLY DIAGNOSIS



With any disease, the importance of early diagnosis cannot be understated. The earlier something can be diagnosed today, the better it can be treated tomorrow. The same goes for Parkinson's Disease and other similar neurological disorders for which there are no diagnostic tests for, rather just assessments of clinical symptoms.



QABY, short for “Qatar Antibodies,” is a laboratory kit designed to diagnose Parkinson’s in its early stages by measuring the form of the protein in blood and cerebrospinal fluid samples that cause the disease. The significance of this technology is immense within the field of neurological disorders as well as for the disease itself, the second most common neurodegenerative disorder affecting the elderly at the motor and cognitive levels. Dr. Omar El-Agnaf, Executive Director of QBRI and a pioneer in the field of Parkinson’s and related neurodegenerative diseases says, “Currently, there are no biomarkers or diagnostic tests available for Parkinson’s; clinicians can only diagnose using clinical symptoms and by that time, it’s too late—those patients have already had 60-70% of their neurons affected or lost. It’s important to identify patients who are at risk of developing the disease as early as possible and give them opportunity for treatment.”

The kit was developed by a team under Dr. El-Agnaf led by Dr. Nour Majbour, a former neurological researcher at QBRI. Dr. Majbour joined season ten of Stars of Science, the Arab world’s leading scientific ‘edutainment’ reality TV program, with this innovation, giving the Arab region a look into this incredible technology. Using in-house novel antibodies, reagents, and protocols, QABY can specifically detect the toxic form of the protein (alpha-synuclein) that causes the disease, sparing the good form, unlike any other test.

While QABY started as a diagnostic kit, Dr. El-Agnaf

sees it as a biotech startup, the first of its kind in Qatar. “We see QABY biotech as the first building block for an emerging biotechnology hub in Qatar and the region.” QABY promises to be the first of a legacy of technology that translates health innovations from research to industry.

Cell lines under the QABY trademark were licensed to Abcam (UK). These cell lines produce monoclonal antibodies that recognize monomers, aggregated and non-phosphorylated α -synuclein, which can be used to detect or quantify Lewy body diseases and Parkinson’s disease. The novel antibodies offer features that are unlike other commercially available antibodies. The license covers research and diagnostic use only.

The power of this tool has been seen by others in the industry as well. Austrian biotechnology company AFFiRS (a leading name in the field of developing immunotherapies that target chronic diseases with unmet medical needs), has partnered with QBRI to use QABY technology to assess the company’s Parkinson’s Disease vaccine which is in phase II clinical trials.

“With so many people affected by Parkinson’s disease globally, QBRI is committed to collaborative research with dedicated partners around the world, such as AFFiRS and others working across Europe on contributing to better understanding of the mode of action, with a view to helping achieve the next landmark in Parkinson’s disease cure,” says Dr. El-Agnaf.



CAPACITY BUILDING

As an established biomedical research institute, QBRI has numerous scientists working within its three disease centers, constantly developing new publications, ideas, and projects. But just because there are many areas within QBRI already thriving doesn't mean there isn't room for capacity building. By developing and strengthening the skills and abilities of undergraduate and graduate students and those early in their careers, QBRI can help cement the careers of future scientists.

There are several avenues of capacity building at QBRI: the summer research program, supervising graduate students from HBKU, teaching at HBKU, early career webinars, internship opportunities, and the research fellow program. "Our main focus is research, but we're also committed to building future scientists of Qatar, which means participating and contributing in any way we can," says Lina Hassna, Programs & Partnership Senior Manager at QBRI.


The first of these, the Summer Research Program (SRP), allows undergraduates from universities across Qatar and the greater area to come to QBRI to develop their research skills. Over the course of eight weeks, students will have intensive training opportunities in one of QBRI's major fields: cancer, diabetes, or neurological disorders. This hands-on experience, combined with mentoring, workshops, seminars, and career counseling has proven to be successful at recruiting undergraduates to join the HBKU graduate program

As a part of HBKU, we have the opportunity to develop research skills and passions within future scientists at an early stage. QBRI contributed to developing the programs for post-graduate students at HBKU and helps supervise/teach PhD and master's program students.

"We target different groups for capacity building and skill development," says Hassna. In addition to undergrad and post-grad students, QBRI launched its research fellow program to support Qatari PhD holders through mentoring, funding, and helping start their own projects.

In an effort to foster a love of science even before university, QBRI participates in science competitions for school-age children by allowing its researchers to be judges. Shadowing opportunities are also available for school-age and undergrad students where the student will come to QBRI and observe scientists over the course of a couple of days to better understand what a career in the science field looks like and to receive advice from QBRI's scientists in terms of helping that student select a research field.

QBRI recently launched an early career webinar series called QBRI Talks, "Guide for Early-Career STEM Researchers Career Development," the series tackles topics important for up-and-coming scientists, like how to apply for funding, writing publications, or preparing a CV. "We select specific topics we feel are important for a young researcher," says Hassna. "It has been a very

A photograph of two male scientists in a laboratory. They are both wearing white lab coats, blue surgical masks, and blue gloves. The scientist in the foreground is leaning over a workbench, using a pipette to transfer liquid into a multi-well plate. The scientist in the background is also working at the same bench. The lab bench is cluttered with various items, including a stack of 25ml and 10ml Thermo Scientific tubes, a calculator, and other lab equipment. Shelves with more lab supplies are visible in the background.

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successful initiative, and we have been in collaboration with many different local and international speakers.”

The webinars were a way to connect with young researchers during the COVID-19 Pandemic, when face-to-face interactions were limited. Senior Scientists

from QBRI, Qatar, and the international community are invited to talk to young students and scientists interested in STEM fields. It’s a type of guidance that proves crucial to young people interested in science to help them take the next steps in their future.





RESEARCH FELLOWS RISING STARS

These fellows are given the opportunity to establish their own labs in the area of their interest, which align with those of QBRI, provided with funds to start their projects, and a team of researchers.



Part of QBRI's initiatives for capacity building is its research fellowship program, which allow Qatari post-doctoral science professionals the chance to do their own research under the support of QBRI. These fellows are given the opportunity to establish their own labs in the area of their interest, which align with those of QBRI, provided with funds to start their projects, and a team of researchers. With all of these forms of support behind their initiatives, the research fellows of QBRI are the rising stars of Qatar's science community. To illustrate this, we've featured three researchers, all of whom joined QBRI after participating in the Qatar Research Leadership Program (QRLP), a capacity building program under the Qatar Foundation.

One of these up-and-coming scientists is Dr. Sara Abdulla, a research fellow at the Neurological Disorders Research Center (NDRC). After completing her bachelor's degree in Neurosciences at the University of Nottingham and her PhD in Clinical Neurosciences at the University of Cambridge, she joined QBRI, in large part to give back to her home country of Qatar who had sponsored her education from undergrad through her PhD. "I wanted my research to be impactful and prevalent to the region and Qatar," says Dr. Abdulla.

Her avid interest in neuroscience also attracted her to QBRI, the only institution with a dedicated center for this area of study in Qatar. Since becoming a research fellow, Dr. Abdulla has been given the opportunity to lead a team on a project of her own design, under the umbrella of Autism Spectrum Disorder (ASD). Dr. Abdulla's research investigates molecular contributors during pregnancy and their regulation on early stages of neurodevelopment that may contribute towards the outcome of ASD. She is also a scientific coordinator of the Neurological Disorders Research Center's Interdisciplinary Research Program entitled "Identifying Potential Biomarkers for Autism Spectrum Disorder (ASD)", where she leads investigations that explore coding and non-coding RNA as objective diagnostic biomarkers of ASD, as well as utilizes cell culture

models to understand the underlying mechanisms that contribute to ASD.

Leading a team and establishing her own research as a fellow has been a real learning curve for Dr. Abdulla and an experience that has greatly contributed to the development of her scientific career. "I look back to who I was when I joined QBRI to who I am today, and I'm really grateful for the opportunity of being a research fellow."

Another research fellow with the NDRC is Dr. Abeer Al-Shammari, whose area of interest focuses on understanding the mechanisms in which genetic and environmental risk factors of neurodevelopmental disorders functionally interact and regulate each other and the impact of these interactions on brain development and function. After doing her undergrad in biomedical sciences and masters in bioscience at Cardiff University in the UK, Dr. Al-Shammari received her PhD in biomedical sciences from the University of Oxford.

Dr. Al-Shammari joined QBRI as a research fellow in October 2017. "When we joined, my colleagues and I were offered positions with opportunities to establish our own labs in the area of our interests. We were supported from the beginning to establish our niche, to establish the research program of our interest that at the same time matched with QBRI's research priorities."

Dr. Al-Shammari's particular research interests are studying autism and how immune dysfunction may contribute to the disease mechanism. To conduct this research, she established a program, recruited three team members, and applied for external funding to add to internal monetary support.

"When I first joined, there was no research in this area. Now, everything is up and running," says Dr. Al-Shammari. "I collaborated my research with clinicians here in Qatar at clinical hospitals so we can get patient samples to analyze, and we're getting interesting results. With support from QBRI through this program, I was able to make it happen, and I'm so happy that now I'm getting even deeper into the field of my interest."

A research fellow with the Diabetes Research Center (DRC) at QBRI, Dr. Heba Al-Siddiqi has been working with stem cells for over ten years. After graduating from Cardiff University in the UK with a bachelor's in biomedical sciences, she went on to train at the Harvard Stem Cell Institute and Department of Stem Cell and Regenerative Biology in Boston. Before joining QBRI in 2018, Dr. Al-Siddiqi received her PhD from the University of Oxford in 2018. Learning of QBRI's interest in diabetes and stem cell work interested her to join the fellowship program.

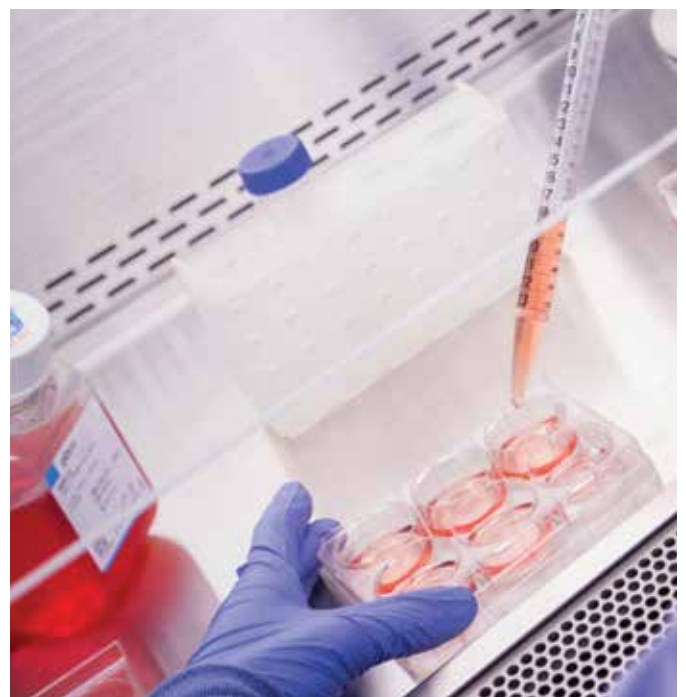
After starting her fellowship, Dr. Al-Siddiqi applied for a start-up fund and established a research group to undertake her main research project: using human stem cells to generate pancreatic beta cells. "Our future and ultimate goal is to generate cells that express insulin and

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can be used for cell therapy or transplantation in the future." Within her role at QBRI, Dr. Al-Siddiqi has had the opportunity to participate in an important national program between QBRI and the Harvard Stem Cell Institute.

As the future of Qatari biomedical research, these research fellows represent just a few of the amazing rising stars in the field.



THE IMPACT OF QBRI

As a biomedical research institute, QBRI has an impact on anyone who has been affected by the diseases that the institute studies like diabetes, neurological disorders, breast cancer, autism, and more. But the scope of QBRI's impact is so much wider than just patients and their families and friends; QBRI's research impacts local and international communities.

Dr. Mahmoud Naas, QBRI's Research Grant Manager, explains that "in order to measure the quality of our research, QBRI commissioned an independent study by Elsevier, one of the largest and most respected publishers of scientific literature." Using five metrics of analysis—citations, usage, captures, mentions, and social media—Elsevier analyzed QBRI's performance between 2016 and 2020 to see how the institute compares to its peers and competitors both locally and globally. For a young institution (QBRI was founded in 2012), the analysis' results of the surpassed expectations.

The number of publications produced and how often they are cited by other institutions was one of the main measures of analysis in the study. During the subject period, QBRI published 315 publications, a growth rate of 48%. According to the report from Elsevier's findings,

a quarter of this output is amongst the global top 5% most highly cited publications, a share of more than four times the global average.

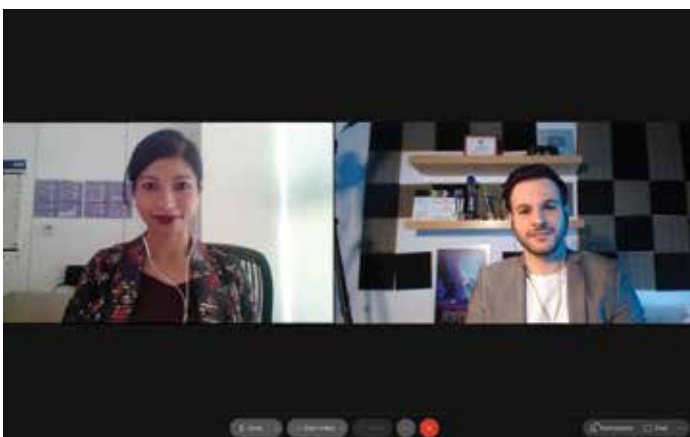
"You can see the impact of the work we publish," says Dr. Nasser Zawia, Research Director at QBRI. Elsevier's Field-Weighted Citation Impact (FWCI) indicates that QBRI's research was cited 80% higher than the global average, an impressive statistic for the institute.

"All in all, the report and its key findings speak to the fact that QBRI is doing world-class research and is among the top research institutes in the region and within Qatar. That speaks volumes to the kind of science we've been working on," says Dr. Zawia.

While the impact that QBRI has on the research field is apparent from these numbers produced by Elsevier, there are other measures of the institute's impact, particularly in the local community. By using a combination of online and in-person awareness campaigns, lectures, and webinars, QBRI is targeting PR efforts to make a difference within the community.

QBRI communication efforts serve to reach out to general stakeholders as well as the local and international audiences. It's part of showcasing what QBRI does, how such research benefits the community, and how it affects lives. It is important that our audience recognize that eventually, this research aims to enhance the healthcare system in Qatar.

One avenue of communication to various communities is QBRI's Insight web series. Launched in spring of 2020, the series discusses trending global subjects about prevalent diseases on QBRI's website and social media. The series launch at the onset of Covid meant much was dedicated to this topic, particularly to correcting a lot of misinformation. The initiative was extremely successful, particularly because there was and still is a scarcity of resources about Covid written in Arabic. After launching the series, QBRI's website



Another crucial aspect of QBRI's initiatives involved community outreach and public awareness for which there was a significant lack, particularly in Arabic.



saw more than 180,000 organic views in the 2020–2021 academic year.

“At the time we launched the series, we felt the public needed a source of trusted information,” says Lina Hassna, Programs & Partnership Senior Manager.

QBRI also hosts scientific webinars featuring both local and international speakers. These webinars tackle trending scientific subjects and other topics related to QBRI’s research or provide unique looks into various aspects of the institute like the equipment and capabilities housed at QBRI.

To fully engage with the public on the diseases that QBRI studies, the institute runs awareness campaigns in collaboration with local partners. Each campaign is dedicated to a different disease and includes webinars and Insight Series as well as social media videos, TV

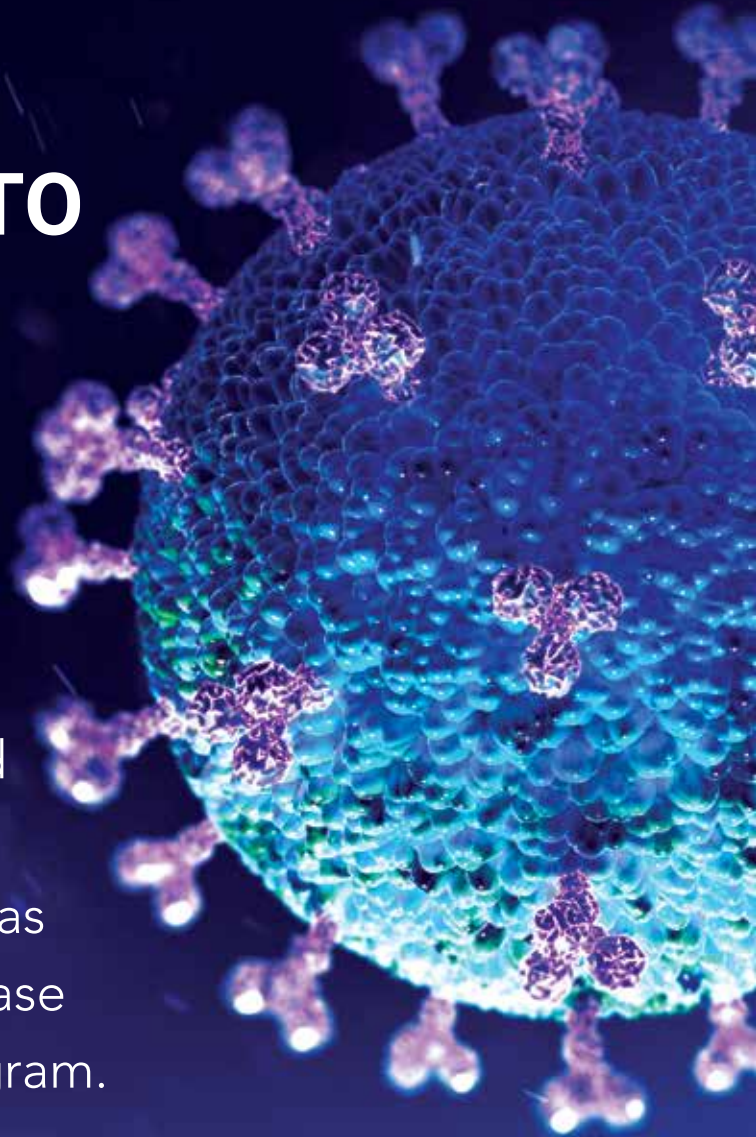
interviews and newspaper features. The importance of these campaigns can be critical in diseases like breast cancer where early detection is important or diabetes where prevention is key. These often-month-long awareness campaigns are meant to teach the public about the factors that might affect them in relation to these diseases, understanding the disease, its source, and how to prevent it. QBRI has managed to plan several successful campaigns.

“As a research institute, we value the public role in our research, thus we aim to highlight the importance of the research we conduct and how it can positively affect people’s lives,” says Hassna. “This can also be reflected in encouraging participation in our projects in terms of providing needed samples or taking part in our different activities. Such a relationship with the public is paramount to us.”

“All in all, the report and the key findings of it speak to the fact that QBRI is doing world-class research and is among the top research institutes in the region and within Qatar. That speaks volumes to the kind of science we’ve been working on.” - Dr. Zawia

QBRI'S EFFORTS TO TACKLE COVID-19

Several initiatives were started within QBRI to address the pandemic, the first of which was developing an infectious disease interdisciplinary research program.



When the COVID-19 pandemic hit in the spring of 2020, QBRI was in a unique position as a biomedical research institute to mobilize its resources immediately and aid the government, provide the public with information, volunteer the use of labs and scientists, and assist in the development of tests. Each of these efforts were no small feat and involved the collaboration of other institutions, government entities, and the whole of QBRI and its researchers.

In addition to contributions made within the organization, QBRI supported Hamad Medical Corporation (HMC) and Sidra Medicine in efforts against COVID-19 by transferring equipment, volunteering research skills for analyzing COVID-19 samples, sharing reagents, and developing and validating a PCR test to determine SARS-CoV-2 infections. QBRI also used its established collaboration with biotech company Sengenics to validate and offer the company's new serological test for COVID-19 research use.

Several initiatives were started within QBRI to address the pandemic, the first of which was developing an infectious disease interdisciplinary research program. Working in collaboration with national and international entities, the goals of the program were (1) developing diagnostic and predictive biomarkers for infection, COVID-19 complications, and immunity, (2) identifying the therapeutic potential for preventing infection and treating COVID-19 using in-house tools and models, and (3) building capacity for research, development and innovation, and fostering preparedness in Qatar against coronaviruses.



QBRI also collaborated with several institutions to launch research projects, including investigating the changes in urine, saliva, blood antibodies, and lymphocytes among COVID-19 patients and vaccinated patients over a one-year period and investigating immune responses of patients with COVID-19 before and after recovery.

Another crucial aspect of QBRI's initiatives involved community outreach and public awareness for which there was a significant lack, particularly in Arabic. QBRI's Insight Series (in both English and Arabic) highlights the most prevalent scientific news about the COVID-19 pandemic and helps readers stay updated and informed through comprehensive information provided by a trusted source. Several webinars were conducted by local and international experts who addressed COVID-19-related topics and up-to-date information. QBRI researchers also conducted interviews about COVID-19-related topics and produced several scientific editorials for publication.

Since proactively taking on work in the fight against



COVID-19, QBRI has been awarded two grants for its work, submitted three invention disclosures, and published 31 publications about COVID-19.



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