

Sharjah Next Healthcare

29 - 30 October | 2025



مجمع الشارقة للبحوث
والتكنولوجيا والابتكار
Sharjah Research Technology
& Innovation Park



الشارقة: محطة المستقبل
Sharjah Next
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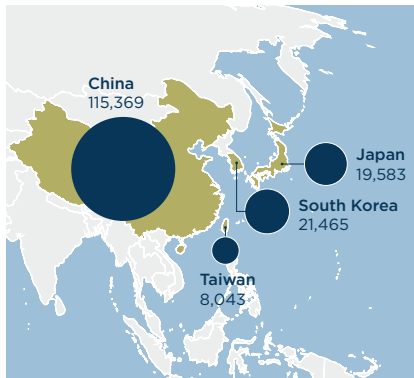
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DNA double helix in a 3D rendered image reflecting how genetics, biotechnology, and precision medicine are transforming healthcare through research-driven, personalized solutions in SRTIP.

IMAGE CREDIT:
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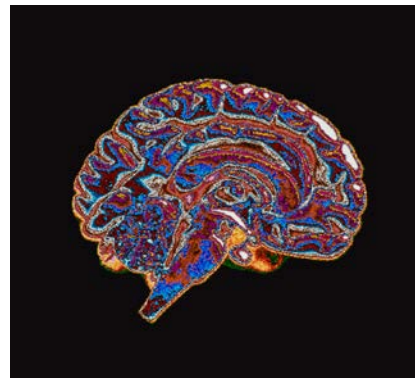
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Sharjah Next: Healthcare is published for Sharjah Research Technology and Innovation Park by Nature Research Intelligence & Nature Custom Media, part of Springer Nature.

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Sharjah Research Technology and Innovation Park extends its sincere gratitude to BEEAH, Medcare Hospitals and Medical Centers, Sharjah Health Authority, Emirates Health Services, and University Hospital Sharjah for their generous sponsorship and invaluable contributions to Sharjah Next: Healthcare. Their support and leadership have been instrumental in shaping a platform that advances innovation and collaboration across the healthcare ecosystem.

Sharjah Next: Setting New Horizons in Healthcare Research

The launch of Sharjah Next marks more than the beginning of a new global gathering. It affirms Sharjah's vision of placing research, innovation, and knowledge at the center of its long-term development strategy. At its core, Sharjah Next is not only about presenting new ideas but about building an ecosystem where science and society move forward together.

Healthcare is the focus of this year's edition. Few areas embody the link between knowledge and humanity more clearly. Advances in medical science determine the quality of our lives, and the resilience of our societies. The urgency of today's health challenges, from the rise of chronic illnesses to the pressures of aging populations, calls for a global response, and Sharjah Next seeks to be a convener of ideas that can shape meaningful solutions.

This year's program highlights research areas that are redefining the boundaries of medicine. Neuroscience is unlocking insights into neurodegenerative disorders and the ways we can strengthen cognitive

resilience. Cardiovascular research is driving innovations to reduce the impact of one of the world's most persistent health burdens. At the same time, advanced therapies are offering new possibilities in oncology, and global efforts against Alzheimer's disease are creating pathways of hope for millions of families. These examples underscore an essential truth: breakthroughs in science are the starting points of progress for entire communities.

Sharjah Next is built on this ethos, that research is not an isolated pursuit but a shared journey, one that transcends borders and disciplines. The event brings together pioneering scientists, innovators, and entrepreneurs who share a conviction that healthcare innovation can and must transform lives.

Yet beyond the science lies a deeper narrative. Sharjah's research ecosystem is evolving into a hub of intellectual generosity, where discoveries are not guarded as trophies but shared as resources for humanity. In this spirit, Sharjah Next celebrates collaboration



Her Highness Sheikha Bodour bint Sultan Al Qasimi, Chairperson and President of the Sharjah Research, Technology and Innovation Park, UAE.

as the foundation of innovation, and promotes knowledge not as privilege but as responsibility.

Sharjah Next is not just an event. It is a statement of intent that Sharjah will continue to invest in science, elevate research to the highest levels, and inspire a new era of discovery. From the laboratories of today to the therapies of tomorrow, we aspire to contribute to a future where healthcare innovation is accessible, equitable, and transformative on a global scale.

Sharjah's Next Leap in Healthcare Innovation

**How an innovation park
and a healthcare forum in
the Emirate of Sharjah are
contributing to world health.**

Since its establishment, the Sharjah Research, Technology and Innovation Park (SRTIP) in Sharjah, UAE, has evolved into one of the region's most dynamic R&D ecosystems, designed to drive innovation through strategic partnerships across sectors. From housing the world's first uSky Transport prototype, to fostering collaborations with global leaders such as Amazon Web Services, Google, and



His Excellency Hussain Al Mahmoudi, CEO, Sharjah Research, Technology and Innovation Park, UAE.

Lenovo, SRTIP is a living lab where ideas are accelerated into reality.

Building on this momentum, we are proud to introduce Sharjah Next: Healthcare, a platform dedicated to exploring the future of healthcare innovation through a multidisciplinary lens.

This landmark two-day forum will unite stakeholders from academia, industry, and government to explore critical advances in human biology, with focus areas including neuroscience and cognitive disorders, cardiovascular and metabolic diseases, and revolutionary diagnostics and therapies.

The event reflects our broader mission: to catalyze impactful partnerships and translate research excellence into transformative outcomes.

Nowhere is this vision more tangible than in the arrival of Heart Biotech, the first biotech company to establish its base at SRTIP. In collaboration with Professor Sir Magdi Yacoub (see page 14), Heart Biotech is pioneering the development of a next-generation heart valve, marking a major milestone in both the park's evolution and Sharjah's growing contribution to global health innovation.

FEATURE

Sharjah: Powering Healthcare Innovation through Research and Technology

Driving research, development, and innovation, Sharjah in the UAE is shaping the future of healthcare with world-class collaborators.

The rise of the Emirate of Sharjah as a center of healthcare innovation has been driven by a bold vision to integrate education, clinical excellence, and research. Anchored in University City, the University of Sharjah and the American University of Sharjah laid the groundwork by nurturing physicians, scientists, and engineers. This academic foundation was reinforced by University Hospital Sharjah, which embeds research within patient care. The establishment of Sharjah Healthcare City was another milestone, attracting international providers through streamlined regulation and world-class infrastructure. Sharjah Healthcare City is the region's first smart-healthcare free zone—a government-designated hub with business-friendly regulations.

Momentum accelerated with the launch of the Sharjah Research, Technology and Innovation Park (SRTIP). Conceived as an R&D hub, SRTIP bridges academia, government, and industry while hosting initiatives in digital health, advanced manufacturing, sustainability, and mobility. Notable partnerships include collaborations with the Sharjah Health Authority and Emirates Health Services on integrated healthcare delivery and policy research; joint work with BEEAH Group to advance sustainability in healthcare infrastructure; and a landmark initiative

with Roche Diagnostics Middle East, positioning Sharjah at the forefront of eco-conscious lab practices through the *My Green Lab* program.

SRTIP has also incubated projects that extend healthcare access, such as mobile clinics serving communities while testing new technologies. The ecosystem is further strengthened by the arrival of advanced biotechnology enterprises, including Heart Biotech, marking Sharjah as a hub for biomedical innovation with global impact.

Now, to ensure that Sharjah stays at the fore of international trends, Sharjah has commissioned Nature Research Intelligence (NRI) to assess its research landscape across the themes of *Sharjah Next: Healthcare*, its flagship event in healthcare R&D (starting on page 3). The study confirms Sharjah's strong research base is aligned with national priorities and global trends. While COVID-19 impacts dominated recent years, emerging research frontiers include neurodegenerative diseases such as multiple sclerosis and Alzheimer's, cardiovascular conditions like non-alcoholic fatty liver disease, and plant-based cancer therapies. The report highlights opportunities to deepen regional partnerships with King Saud University and Cairo University, while strengthening global ties with Oxford University, University College London, McGill University, Cornell



Dr Asma Mahmoud Fikri (PhD, MRSB, AFHEA), Drug Discovery Scientist, R&D Expert, and Director of Government and Corporate Partnerships at Sharjah Research Technology and Innovation Park.

University, and Johns Hopkins University.

Sharjah is preparing for transformative growth with the development of the Jawaher Boston Medical District (see page 22). This flagship initiative will bring together advanced clinical services, cutting-edge research facilities, and training programs in collaboration with leading international institutions. It will anchor Sharjah's ambition to serve as a regional and global hub for healthcare innovation. Complementing this vision, Aster DM Healthcare has expanded its footprint in the emirate with new multi-specialty hospitals, including facilities offering advanced transplant and tertiary care. These investments strengthen healthcare delivery and attract global expertise and partnerships at the forefront of medicine.

Across all these initiatives, AI, precision diagnostics, and digital health stand out as enablers of progress, advancing brain imaging, cardiovascular prediction, and personalized treatments. With an ecosystem that nurtures talent, rewards innovation, and draws international leaders, Sharjah is positioned to remain a cradle of healthcare innovation, powered by the vision and leadership of SRTIP.

Tomorrow's Breakthroughs Today in Sharjah

Sharjah Next is an annual megatrend forum for research and development emerging from Sharjah's academic and innovation ecosystem in response to the UAE's strategic priorities and global challenges.

Organized by the Sharjah Research, Technology and Innovation Park (SRTIP), each edition focuses on one of four critical sectors: Healthcare, Sustainability, Mobility, or Advanced Manufacturing. The event brings together leaders from government, academia, and industry, centering on scientific advancements that are expected to reshape the sector over the next decade.

More than just a showcase, Sharjah Next serves as a platform for global dialogue, collaboration, and knowledge exchange. It highlights breakthrough research, emerging technologies, and cross-sector partnerships that have the potential to influence the future of entire industries.

Positioned as a hub for future foresight, the forum reinforces Sharjah's role in enabling science-led innovation with global impact.

Sharjah today and next: pathways to global impact in healthcare

In framing Sharjah's role in the healthcare innovation landscape, Nature Research Intelligence (NRI) examined research and innovation data for each theme of *Sharjah Next: Healthcare*—‘Unlocking the Brain’, ‘The Powerhouse’ and ‘Systems of Life’—across three geographic scales of analysis:

- **Sharjah**, focusing on the University of Sharjah (UOS) and American University of Sharjah (AUS),
- **the UAE**, encompassing all UAE-based institutions, and
- **the world**, highlighting global innovation trends and hotspots.

For each theme, NRI's analysis showcases the high-level publication and citation trends for Sharjah and the UAE, while uncovering the ‘hot’ topics driving research productivity. Next, it examines the collaboration networks for Sharjah and the UAE, followed by a global view of the leading institutions and innovation hubs shaping the future of research translation. The goal is to assess Sharjah and the UAE's current position, highlight strengths in collaboration and innovation, and identify strategic opportunities where alignment with global frontiers could unlock the greatest impact.

NRI used *Dimensions*—the world's largest abstract and indexing database, with more than 159 million publications and 170 million patents across 200+ disciplines—as the data source for this analysis. Data extracted covered outputs published between January 2020 and mid-August 2025. Research relevant to each theme was identified using two approaches: (1) the *Dimensions Research, Condition, and Disease Categorization (RCDC)*¹ filter to capture key categories; and (2) keyword searches of theme-related terms across titles and abstracts.

For details of the methods used in this analysis, see page 25.

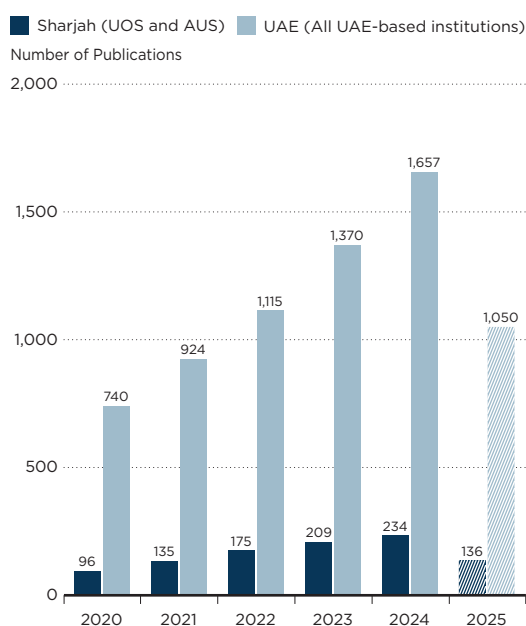
UNLOCKING THE BRAIN

‘Unlocking the Brain’, one of the three themes of *Sharjah Next: Healthcare*, focuses on research in neuroscience and brain health. It captures studies that deepen our understanding of cognitive function and brain conditions, while exploring new approaches

to diagnosing and treating chronic neurological, psychiatric, developmental, and oncological disorders. As a rapidly evolving field, discoveries in neuroscience are reshaping clinical practice and driving breakthroughs across biotechnology, pharmaceuticals, and digital health.

Research publication and citation trends for Sharjah and the UAE

Recently, research within the theme ‘Unlocking the Brain’ has grown significantly in Sharjah and the UAE, reflecting the region's increasing focus on brain sciences. Between 2020 and 2024, publications from UOS and AUS rose at a compound annual growth rate (CAGR) of 24.9%, reaching 234 publications in 2024 (Figure 1). Across all UAE-affiliated institutions, publication growth followed a similar trajectory, with a 22.3% CAGR and a peak of 1,657 publications in 2024. Together, UOS and AUS contributed 14.4% of the national output, emphasizing their significant role in the UAE's expanding neuroscience research ecosystem.



* 2025 data is partial (January to mid-August) and excluded from CAGR calculations.

¹ RCDC is a computerized reporting system the National Institutes of Health (NIH) has used to categorize its funding in biomedical research since 2008. RCDC reports NIH funding in more than 300 research, condition, and disease categories.

FIGURE 1

Yearly publications related to the theme ‘Unlocking the Brain’ (Sharjah vs. UAE, 2020-2025*)

Since 2020, UOS and AUS have produced 985 publications in neuroscience and brain-related fields, attracting nearly 12,000 citations—an average of 12.2 citations per publication. Of these, 18.6% (183) ranked among the world's top 10% most cited, and 3.1% (31) were in the top 1%. Key themes within the top 1% include the impact of COVID-19 on stress, mental health, and sleep; global burden of disease studies on stroke and vision loss; Alzheimer's disease management; and the use of AI for early disease detection. Other highly cited works in the top 10% include studies on autism spectrum disorder, wearable technologies for brain health, the psychological effects of digital environments, and novel therapeutics, highlighting Sharjah's growing contribution to foundational and translational neuroscience research.

Research Spotlight #1—Sharjah: A 2022 study, ranked in the top 1% most cited publications from Sharjah, shows how AI can improve the detection and classification of brain tumors. The international research team, which includes a contributor from UOS, proposes a Gaussian Convolutional Neural Network model that uses image pre-processing and data augmentation to boost accuracy. The model achieved accuracy rates of 99.8% and 97.1% across two datasets, demonstrating the potential of AI to enhance diagnostic precision for patients with brain disorders.

Rizwan, M., et al. *IEEE Access*, **10**, 29731, 2022.

Citation trends across UAE-affiliated institutions show an equally strong performance, with an average of 12.1 citations per publication, based on a total of 6,856 publications and 82,833 citations since

2020. Of these publications, 20.3% (1,394) ranked in the top 10% most cited globally, while 3.0% (206) featured in the top 1%.

These metrics highlight that neuroscience research from Sharjah and the UAE is not only expanding in volume, but gaining significant international visibility and influence.

‘Hot’ research topics in Sharjah and the UAE

Since 2020, the ‘*Impact of COVID-19 on Mental Health and Wellbeing*’ has emerged as the leading NRI topic² for both Sharjah and the UAE, based on publication volume and average citations, within the ‘*Unlocking the Brain*’ theme (Table 1). Many of the highly cited articles in this topic investigate heightened anxiety, stress, sleep disturbances, and lifestyle changes experienced during the COVID-19 pandemic, particularly among young people, patients with chronic conditions, and other vulnerable groups.

Among the leading NRI topics for the UAE, ‘*Multiple Sclerosis Research*’ shows the highest forecasted publication growth (78%), followed by ‘*Alzheimer’s Disease and Cognitive Impairment Research*’ (67%). Looking ahead, beyond strengthening work in these two topics, UOS and AUS could also explore research opportunities and collaborations in ‘*Autism Spectrum Disorder and Intellectual Disabilities*’—a thriving research area in the UAE, but one where Sharjah’s publication volumes are relatively sparse.

Research collaborations involving Sharjah and UAE-based institutions

Since 2020, the United States (US) has been the dominant research partner for both Sharjah and the UAE in neuroscience, contributing to approximately

² For details on NRI topics, see page 25.

TABLE 1

Hot topics of ‘*Unlocking the Brain*’ research (UAE vs. Sharjah, 2020-2025*)

NRI Topics	UAE			Sharjah	
	Total Publications	Average Citations	3-year Forecasted Growth (%)	Total Publications	Average Citations
Impact of COVID-19 on Mental Health and Wellbeing	203	30.4	-36%	45	36.2
Alzheimer’s Disease and Cognitive Impairment Research	173	13.0	67%	30	12.6
Autism Spectrum Disorder and Intellectual Disabilities	146	7.6	36%	6	9.3
Multiple Sclerosis Research	131	4.6	78%	15	7.3
Functional Neuroimaging and Brain Connectivity	118	14.9	-5%	7	11.7
Ischemic Stroke Research	82	11.1	58%	14	33.3
Autism Spectrum Disorder and Neurodevelopmental Genetics	73	13.6	0%	8	5.4
Major Depressive Disorder and Antidepressant Research	72	9.6	-18%	11	4.8
Parkinson’s Disease Research	71	12.0	36%	9	9.4
Brain Tumor Imaging and Segmentation Techniques	67	15.9	33%	9	24.2

*2025 data is partial (January to mid-August). The 3-year forecasted growth (%) is calculated using a drift method to predict publication volumes for 2025, 2026, and 2027.

20% of publications (184 and 1,368, respectively) (Figure 2). Within the US, UOS and AUS have collaborated most with Cornell University (19) and Johns Hopkins University (13), while other UAE institutions have partnered primarily with New York University (161) and Harvard University (127).

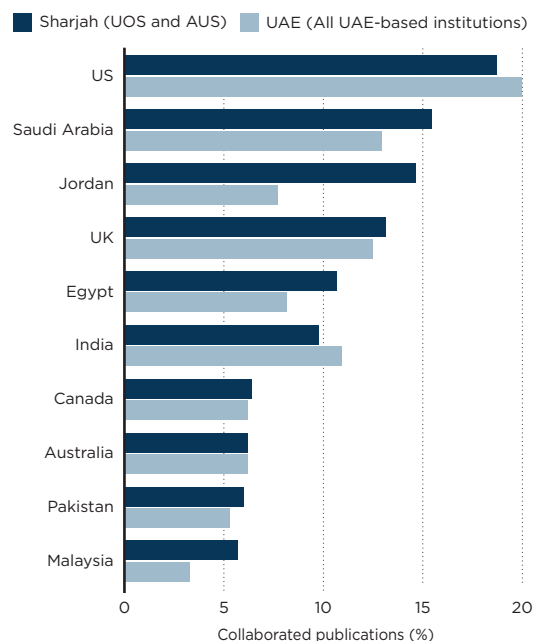
Research Spotlight #2—Sharjah: A 2021 nationwide study published in *BMC Psychiatry* examined the psychological impact of COVID-19 on adults and children in the UAE. Conducted by researchers from the UAE and Saudi Arabia, the study surveyed 2,200 participants. Results showed that 71% experienced generalized anxiety disorder, with younger individuals and females most affected. Children's emotional problems were strongly linked to parental anxiety—especially among teacher-parents—with severely anxious parents being seven times more likely to report such issues. Beyond identifying key risk factors, the study emphasized the urgent need for targeted mental health interventions and resilience-building strategies to support families during public health crises.

Saddik, B., et al. *BMC Psychiatry*, 21, 224, 2021

Saudi Arabia also features as a major international partner, ranking second for both Sharjah and the UAE. Other top collaborators include Jordan, the United Kingdom (UK), Egypt, India, Canada, and Australia, with slight variations in rankings between Sharjah and the UAE. Notably, the final two countries in the top ten differ: Sharjah's list includes Pakistan and Malaysia, whereas for the UAE, China and Pakistan complete the ranking.

FIGURE 2

Sharjah's top 10 international collaborators on 'Unlocking the Brain', benchmarked against the UAE's (2020-2025*)



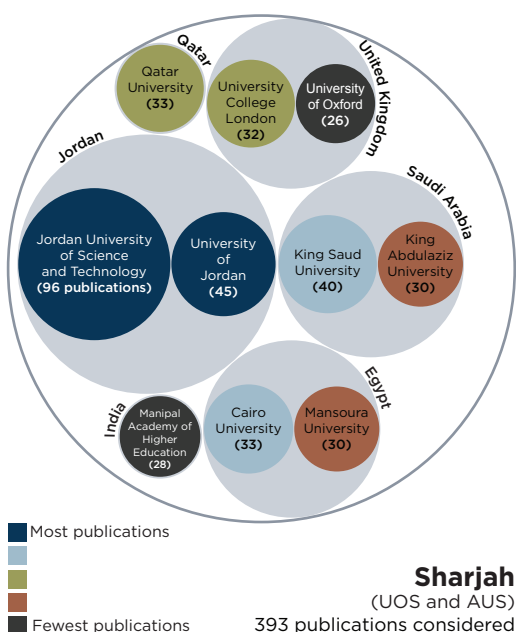
* 2025 data is partial (January to mid-August).

Collaborations with Canada stand out for their impact, yielding the highest average citations per publication—42.8 for Sharjah and 30.2 for the UAE.

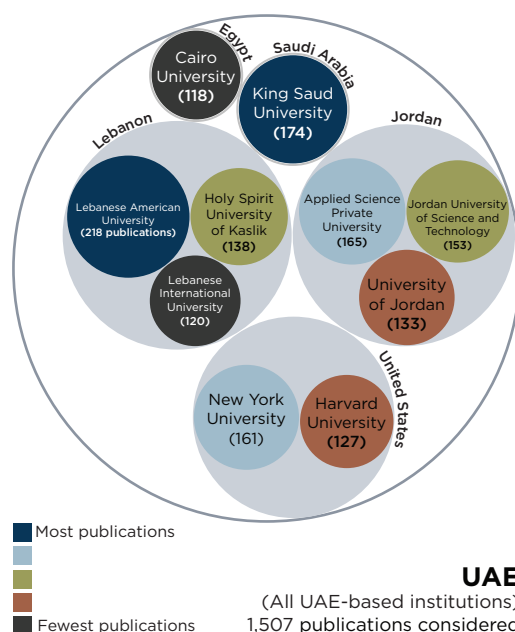
A view of the foremost international institutions collaborating with Sharjah and the UAE on neuroscience reveals Jordan University of Science and Technology to be a key research partner for UOS and AUS (96 publications), followed by the University of Jordan (45) and King Saud University (40) (Figure 3a). For UAE-based institutions, the Lebanese American University (218) and King Saud University (174) lead (Figure 3b).

FIGURE 3A&B

Top 10 international institutions Sharjah and the UAE collaborate with on 'Unlocking the Brain' (2020-2025*)



* 2025 data is partial (January to mid-August).



* 2025 data is partial (January to mid-August).

NRI Topics	Global		
	Total Publications	Total Patent Citations	Patent Citations per 1,000 publications
Autism Spectrum Disorder and Intellectual Disabilities	11,611	44	3.8
Alzheimer's Disease and Cognitive Impairment Research	10,232	331	32.3
Functional Neuroimaging and Brain Connectivity	9,027	189	20.9
Ischemic Stroke Research	7,613	107	14.1
Mental Health Interventions and Treatments	6,783	10	1.5
Glioblastoma Multiforme and High-Grade Gliomas	6,111	242	39.6
Brain Tumor Imaging and Segmentation Techniques	5,799	128	22.1
Impact of COVID-19 on Mental Health and Wellbeing	5,152	10	1.9
Caregiving for Older Adults with Dementia	4,721	1	0.2
Mindfulness and Its Applications in Mental Health	4,673	10	2.1

TABLE 2

Leading topics in neuroscience innovation research (Global, 2020-2025*)

*2025 data is partial (January to mid-August).

Globally leading topics in innovation research

Globally, research on 'Autism Spectrum Disorder and Intellectual Disabilities' leads by output since 2020, with more than 11,600 publications, reflecting widespread academic interest and clinical relevance (Table 2). To show the translational potential of global neuroscience research, these NRI topics can be ranked by their rate of patent citations (i.e., the number of different patent documents citing publications within the topic, per 1,000 publications). On this basis, 'Glioblastoma Multiforme and High-Grade Gliomas' stands out, recording the highest patent citation rate (39.6 citations per 1,000 publications), indicating strong links to applied research and technological development. Similarly, 'Alzheimer's Disease and Cognitive Impairment Research' shows high innovation impact (32.3). For Sharjah and the UAE,

these topics represent fertile ground for developing an innovation footprint to advance diagnostic tools, therapeutic strategies, and new technologies.

World-leading innovation hotspots

Since 2020, China (115,369) and the US (85,073) have been the leading countries in publishing patents for neuroscience-related innovation and technology. South Korea (21,465), Japan (19,583), and Germany (8,901) round out the top five (Figure 4). The growth rate (CAGR) of patents published between 2020 and 2024 is indicative of the pace of innovation across countries. While China (6.2%), the US (0.5%), and South Korea (2.5%) show steady growth, the most notable increases among the top 50 countries by patent volume come from India (35.6%), Thailand (28.8%), Argentina (28.8%), and Qatar (27.0%).

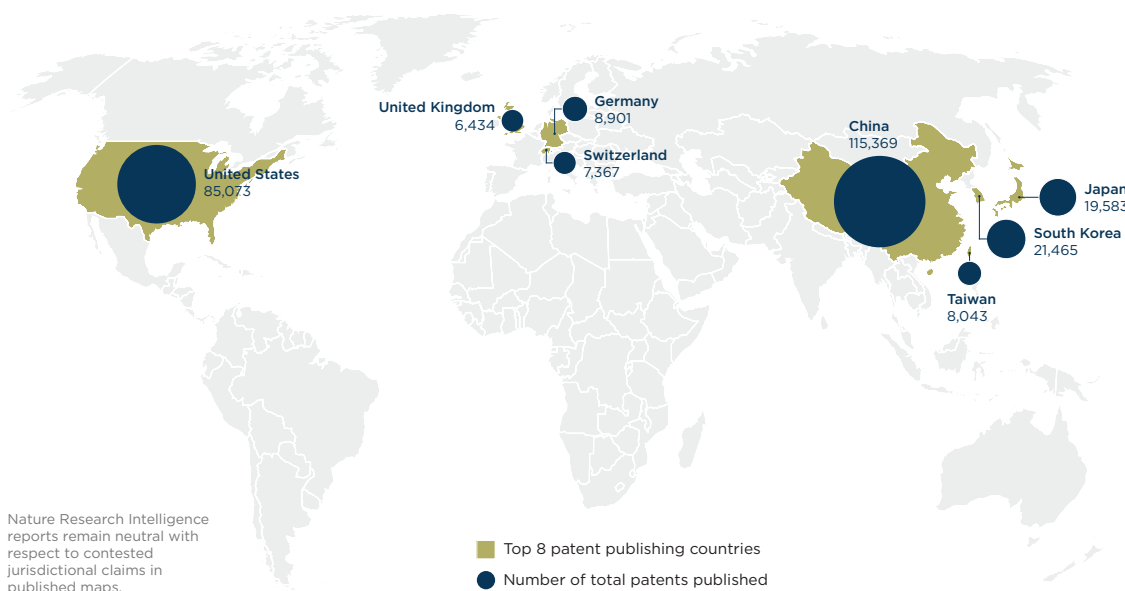


FIGURE 4

Global map of world-leading hotspots for innovation on 'Unlocking the Brain' (2020-2025*)

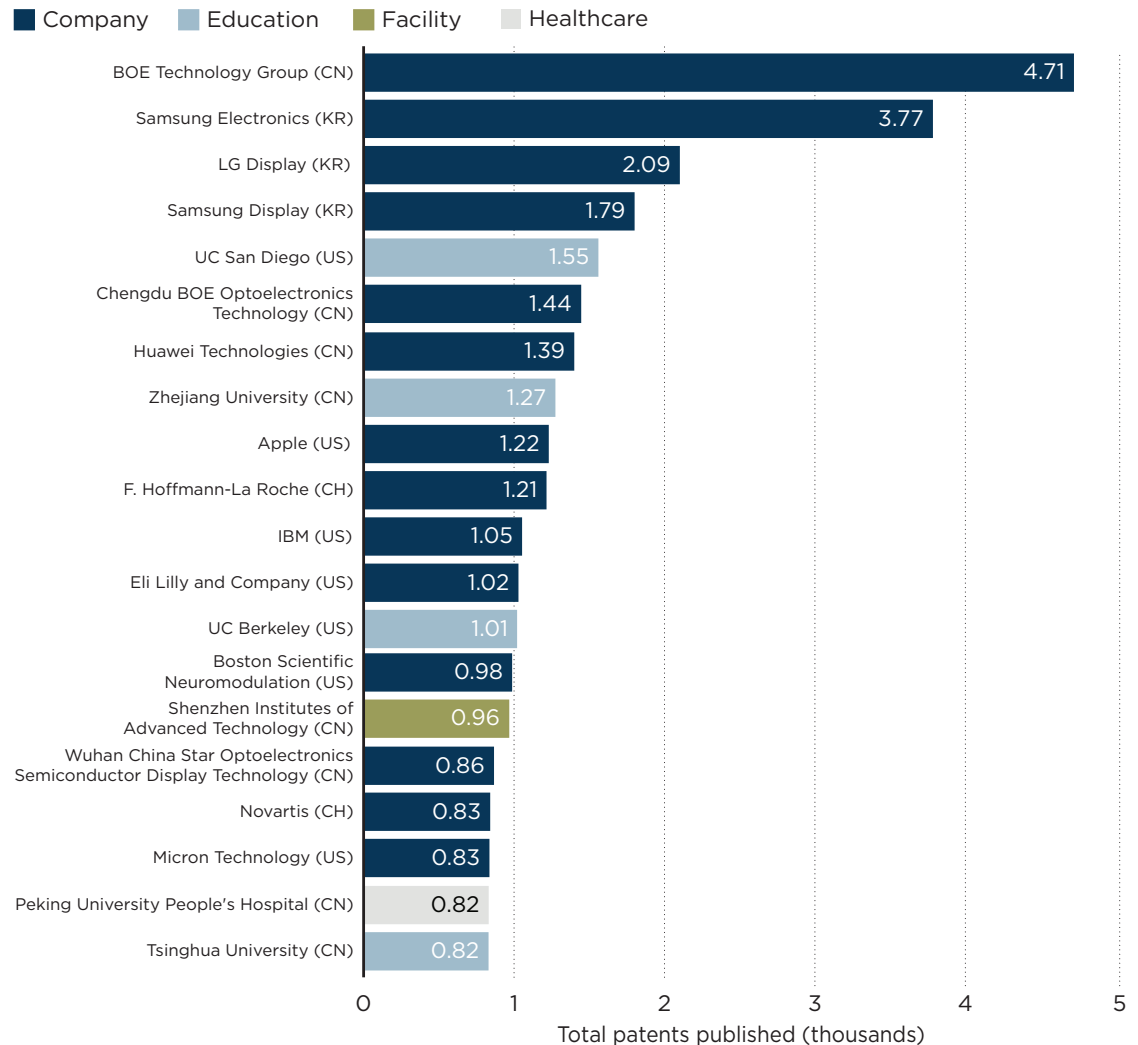
* 2025 data is partial (January to mid-August).

Identifying leading patent assignees can inform collaboration strategies for innovation. Of the top 50 assignees, by neuroscience-related patent volume since 2020, 34 are corporate entities and 16 are universities. The majority of corporate assignees fall within the technology or pharmaceutical sectors. The top five assignees include: BOE Technology Group (4,705, China); Samsung Electronics (3,770, South Korea); LG Display (2,092, South Korea); Samsung Display (1,792,

South Korea); and the University of California San Diego (1,552, US) (Figure 5). Measuring by the growth rate of patents since 2020, Chengdu BOE Optoelectronics Technology (41.7%, China), Therapeutics Inc. (39.0%, US), Zhejiang University (24.8%, China), Shenzhen Institutes of Advanced Technology (23.4%, China), and Peking University People's Hospital (18.2%, China) are the key assignees placing innovation at the centre of their strategic decision-making.

FIGURE 5

Leading organizations from the top eight patent publishing countries by total patents published for 'Unlocking the Brain' (2020-2025*)

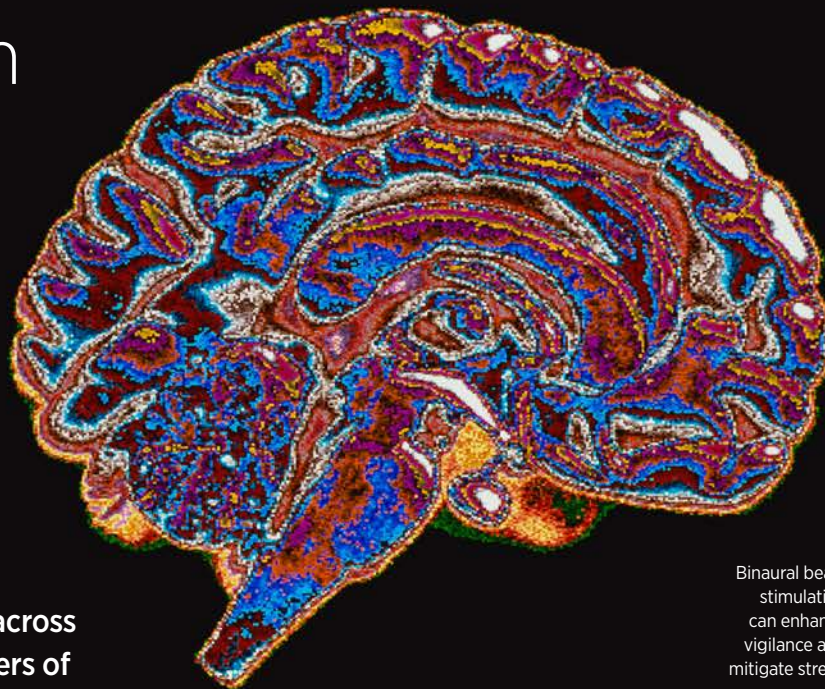


* 2025 data is partial (January to mid-August).
CH - Switzerland; CN - China; KR - South Korea; US - United States

This figure displays the leading patent assignees from the top eight patent publishing countries for 'Unlocking the Brain'.

Could Phantom Beats Reduce Stress and Improve Workplace Performance?

Auditory stimulation enhances synchronization and connectivity across brain regions while reducing markers of stress and improving cognition scores.



Binaural beats stimulation can enhance vigilance and mitigate stress.

An illusory pulsed sound, conjured within the brain, may help counteract stress, sharpen focus and boost performance in challenging cognitive tasks, according to a multifaceted study led by researchers at the American University of Sharjah in the UAE.

Conducted in collaboration with researchers from UAE University and Sapienza University of Rome, the study explored a technique called binaural beats (BB) brain stimulation, which is delivered via headphones and might improve performance in high-pressure jobs such as security and healthcare.

Stress is known to impair cognitive functions, including working memory and flexible thinking. In the long term, it can reduce productivity and damage health, increasing the risk of heart disease and depression, for example. BB stimulation may offer a simple, non-invasive way to help counter these effects.

The method involves playing tones of slightly mismatched frequencies—one in each ear. The listener perceives a third phantom tone, the binaural beat, pulsing at a frequency halfway between the two played tones. Brain activity patterns can

fall into step with this phantom beat, increasing synchronicity and connectivity across brain regions. Earlier studies found that BB stimulation in the 15-16 Hz frequency range improves concentration and reduces anxiety.

“Brain activity patterns can fall into step with this phantom beat.”

To test the effect of 16 Hz BB under stress, the researchers asked volunteers to perform the Stroop Color-Word Test (SCWT), in which they had to match the font color of a word to the correct color box, even when the word itself named a different color, completing as many matches as possible in 30 seconds.

While performing the task, neural activity was measured using a technique called functional near-infrared spectroscopy. Immediately after each test round, salivary levels of a stress biomarker called alpha amylase were measured.

BB stimulation boosted participants' SCWT accuracy scores by 14%, while lowering stress biomarker levels by 20%.

To simulate acute work stress, participants had their SCWT time limit cut by 20%, causing stress levels to spike, and colour-matching accuracy to plummet from almost 100% to below 60%. But when BB was activated, the stress biomarker levels fell by 44% compared to peak levels, and test accuracy improved by 25%.

Images revealed that BB stimulation concentrated activity in the right hemisphere of participants' brains, and strengthened connectivity between the right and left dorsolateral prefrontal cortex, a region associated with working memory, abstract thinking and regulating attention and emotion.

The study, which was identified in an analysis of brain research in the Emirate of Sharjah by Nature Research Intelligence (see page 3), concluded that BB stimulation can enhance vigilance and mitigate stress, making it a promising tool for improving cognitive performance in high-pressure environments that warranted further study.

Al-Shargie, F. *et al.* Stress management using fNIRS and binaural beats stimulation. *Biomed. Opt. Express* **13** (6), 3552-3575, 2022.

THE POWERHOUSE

The heart, the body's powerhouse, is another key theme of *Sharjah Next: Healthcare*, reflecting the growing importance of cardiovascular research for global and regional health. It covers cardiovascular and metabolic disorders, as well as the mechanisms, development, and normal function of the heart and vascular system. Research spans a wide range of conditions, including coronary heart disease, cardiomyopathy, arrhythmia, cardiac arrest, diabetes, and obesity. As one of the world's most persistent health burdens—and the leading cause of death globally and in the UAE—cardiovascular disease continues to drive innovation in research and clinical practice, aiming to reduce its impact on individual health and societal wellbeing.

Research publication and citation trends for Sharjah and the UAE

Cardiovascular research has grown steadily in Sharjah and the UAE since 2020. Although the pace has been somewhat slower than the surge in neuroscience research, it remains a vital and expanding field in the region. Between 2020 and 2024, publications from Sharjah's UOS and AUS grew at a CAGR of 16.9%. Across UAE-affiliated institutions, growth was similar at 17.7%, peaking at 1,013 publications in 2024 (Figure 6). Together, UOS and AUS contributed 14.2% of the national UAE output, closely mirroring their share in neuroscience and underscoring their importance in advancing health science in the region.

Since 2020, UOS and AUS have generated 616 cardiovascular publications, accumulating 9,143

citations—an average of 14.8 citations per publication. Among them, 18.3% (113) ranked in the world's top 10% most cited, and 1.9% (12) were in the top 1%. Recurring themes across these highly cited outputs include the complex interplay between cardiovascular disease and diabetes, covering diabetic complications, predictive modelling, and the role of nutrition and the gut microbiome. COVID-19-related cardiovascular impacts also feature prominently, alongside research on oxidative stress, endothelial dysfunction, and chronic heart failure. AI technologies are applied across diagnostics, risk prediction, and remote monitoring, while other focus areas include gender-based risk factors, wearable technologies, biomarkers, and alternative therapies. Collectively, these themes highlight Sharjah's diverse contribution to cardiovascular science and its growing visibility in the global health discourse.

Citation trends across UAE-affiliated institutions reveal an average of 12.2 citations per publication, based on 4,353 publications and 52,906 citations since 2020. Of these publications, 17.2% (747) ranked in the top 10% most cited globally, while 2.3% (102) were in the top 1%.

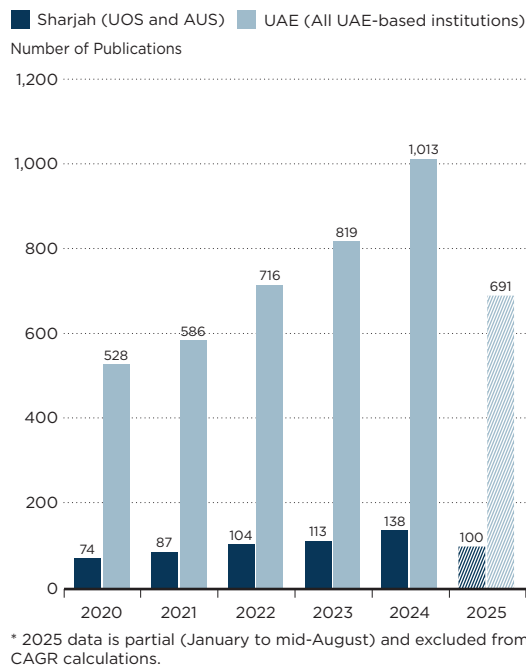
'Hot' research topics in Sharjah and the UAE

Since 2020, '*Diabetes, Heart Failure, and Chronic Kidney Disease Management*', '*COVID-19 Research and Impacts*', and '*Hypertension Management and Cardiovascular Health*' have surfaced as the leading NRI topics, based on publication volume for Sharjah and the UAE within '*The Powerhouse*' theme (Table 3). For the UAE, '*Automated Detection and Diagnosis of Diabetic Retinopathy Using Deep Learning Techniques*' showed the strongest citation impact—a topic focused on using deep learning methods to improve diagnosis of a diabetes-related eye condition. By comparison, Sharjah has only a small research footprint in this topic.

³ Note on nomenclature: There are ongoing efforts to redefine *non-alcoholic fatty liver disease (NAFLD)*. Experts from the Middle East and North Africa recommend renaming it *metabolic-associated fatty liver disease (MAFLD)* and adopting positive diagnostic criteria, to better reflect its pathophysiology and support regional health policy.

FIGURE 6

Yearly publications related to the theme '*The Powerhouse*' (Sharjah vs. UAE, 2020-2025*)



Research Spotlight #3—Sharjah: A recent UOS study, among the UAE's top 1% most cited publications globally, showcases how remote healthcare monitoring and machine learning can transform diabetes care. The authors present a framework that integrates wearables, smartphones, and personal health devices to automate data collection and predict diabetes risk with minimal patient effort. At its core is a Support Vector Machine model trained on the Pima Indian Diabetes Database, achieving 83.2% accuracy, 87.2% sensitivity, and 79.0% specificity. By consolidating data across devices and vendors, the system enables seamless interoperability, providing clinicians with real-time lifestyle insights and alerts to support early, proactive, and patient-centered intervention.

Ramesh, J., et al. *Healthc. Technol. Lett.*, **8**, 45, 2021.

Looking ahead, '*Non-Alcoholic Fatty Liver Disease Research*'³ is forecasted to grow publications most rapidly in the UAE—70% over the next three years. Fatty liver disease linked to metabolic dysfunction is of particular

NRI Topics	UAE			Sharjah	
	Total Publications	Average Citations	3-year Forecasted Growth (%)	Total Publications	Average Citations
Diabetes, Heart Failure, and Chronic Kidney Disease Management	308	8.6	49	27	6.6
COVID-19 Research and Impacts	154	22.2	-340	38	30.1
Hypertension Management and Cardiovascular Health	102	17.5	35	21	10.5
Cardiovascular Disease and Lipid Management	96	9.0	33	6	5.0
Cardiac Signal Processing and Deep Learning Techniques	58	11.5	39	13	7.2
Machine Learning Approaches for Cardiovascular Disease Prediction	58	8.6	39	12	15.3
Non-Alcoholic Fatty Liver Disease Research	55	25.2	70	0	0.0
Vitamin D Deficiency and Health Implications	49	10.5	-71	13	5.0
Automated Detection and Diagnosis of Diabetic Retinopathy Using Deep Learning Techniques	46	26.6	0	5	10.2
Periodontal Disease Research	44	6.0	-80	10	10.3

TABLE 3

Hot topics of 'The Powerhouse' research (UAE vs. Sharjah, 2020-2025*)

*2025 data is partial (January to mid-August). The 3-year forecasted growth (%) is calculated using a drift method to predict publication volumes for 2025, 2026 and 2027.

concern in the Middle East and North Africa, where prevalence is higher than in other regions of the world. This topic is characterized by studies on fatty liver disease and its links to obesity, diabetes, and cardiovascular risk, and emerging strategies for diagnosing and treating the condition. Interestingly, neither UOS nor AUS have published in this area during the analysed period, suggesting a potential gap. Considering the relevance to global health and the UAE's existing expertise, this topic presents a strategic opportunity for Sharjah to engage in new collaborations in the region.

Research collaborations involving Sharjah and UAE-based institutions

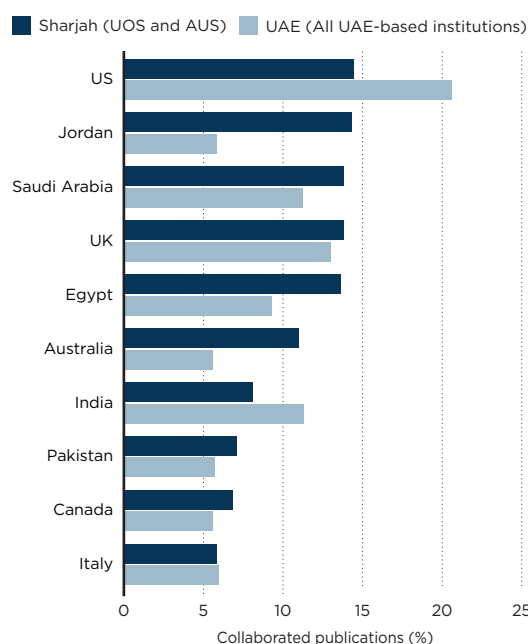
Internationally, as with research on 'Unlocking the Brain', the US remains the dominant research partner, featuring in 14.5% of Sharjah's cardiovascular publications (89) and 20.6% of the UAE's (898) (Figure 7). Sharjah's UOS and AUS also publish in broadly equal measure with Jordan (88), Saudi Arabia (87), the UK (87), and Egypt (84).

For the UAE, the UK ranks as the second-largest international partner (565 publications), closely followed by India (490), Saudi Arabia (488), Egypt (403), Italy (266), and Pakistan (254).

Focusing on international institutions partnering with Sharjah and the UAE on cardiovascular research since 2020, the Jordan University of Science and Technology emerges as the leading collaborator for Sharjah's UOS and AUS (47 publications), followed by King Saud University (40) and the University of Jordan (37) (Figure 8a). For UAE-based institutions, King Saud University (166), Cairo University (103), the Jordan University of Science and Technology (98), and Harvard University (92) lead (Figure 8b).

Globally leading topics in innovation research

Globally, 'Diabetes, Heart Failure, and Chronic Kidney Disease Management' leads by research output since 2020, with over 8,400 publications (Table 4). In terms of translational potential—measured by patent citation rates—'Cardiac Signal Processing and Deep Learning Techniques' ranks first, with 46.2 citations per 1,000 publications. This reflects the growing role of AI and computational tools in advancing cardiac diagnostics and monitoring technologies.

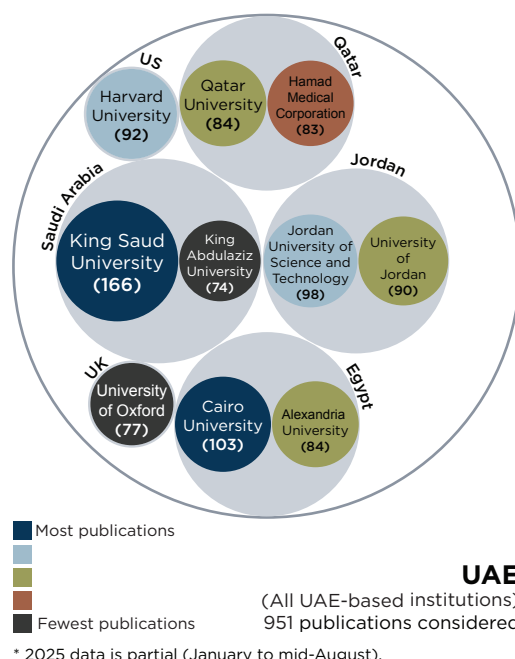
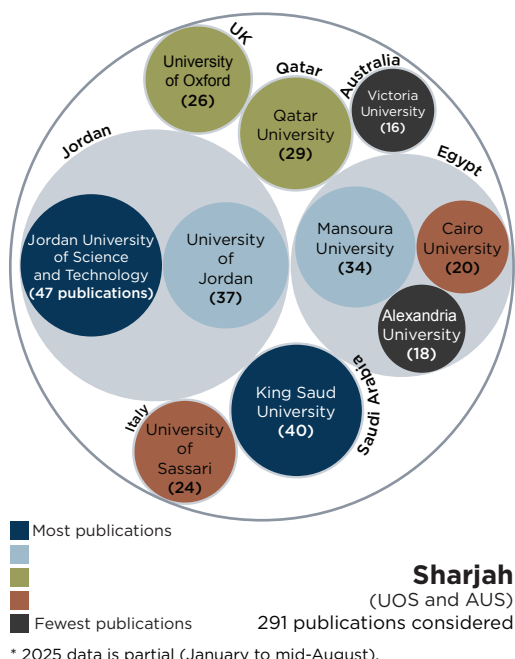

FIGURE 7

Sharjah's top 10 international collaborators on 'The Powerhouse', benchmarked against the UAE's (2020-2025*)

* 2025 data is partial (January to mid-August).

FIGURE 8A&B

Top 10 international institutions Sharjah and the UAE collaborate with on 'The Powerhouse' (2020-2025*)



Sharjah and the UAE demonstrate a strong research footprint across several globally leading topics in this space, including 'Diabetes, Heart Failure, and Chronic Kidney Disease Management' and 'Hypertension Management and Cardiovascular Health' (see Table 3). While they have also contributed substantially to research on 'Cardiac Signal Processing and Deep Learning Techniques', this area may offer untapped potential. Strengthening local innovation capacity and fostering global partnerships in this high-impact field could enhance Sharjah and the UAE's role in shaping the future of cardiovascular healthcare.

World-leading innovation hotspots

Since 2020, the US (45,551) and China (40,842) have led global cardiovascular patent activity, together accounting for the majority of patents

published in this field. South Korea (4,831), Japan (4,672), and Germany (4,265) complete the top five (Figure 9). Among emerging innovation hotspots, Thailand (56.5% CAGR), Turkey (32.3%), India (23.3%), Hungary (22.4%), and Saudi Arabia (16.7%) have recorded the fastest patent growth from 2020 to 2024.

Uncovering the key patent assignees, by cardiovascular-related patent volume since 2020, provides Sharjah with strategic visibility into the key actors driving innovation within 'The Powerhouse' theme. Among the top 50 assignees, 37 are corporate entities, nine universities, and four hospitals. The top five assignees include: Edwards Lifesciences (3,739, US); Medtronic (2,410, US); Koninklijke Philips (1,458, Netherlands); Eli Lilly and Company (1,033, US); and Boston Scientific Scimed (834, US) (Figure 10).

TABLE 4

Leading topics in cardiovascular innovation research (Global, 2020-2025*)

NRI Topics	Global		
	Total Publications	Total Patent Citations	Patent Citations per 1,000 publications
Diabetes, Heart Failure, and Chronic Kidney Disease Management	8,485	182	21.4
Cardiac Signal Processing and Deep Learning Techniques	5,434	251	46.2
Hypertension Management and Cardiovascular Health	4,968	74	14.9
Machine Learning Approaches for Cardiovascular Disease Prediction	4,439	28	6.3
Percutaneous Coronary Intervention and Antiplatelet Therapy in Acute Coronary Syndrome	3,394	15	4.4
Aortic Valve Replacement and Transcatheter Aortic Valve Implantation	3,109	39	12.5
Machine Learning Applications in Diabetes Prediction and Diagnosis	3,031	28	9.2
Cardiovascular Disease and Lipid Management	2,791	60	21.5
Coronary Artery Disease Interventions	2,733	17	6.2
Extracorporeal Membrane Oxygenation and Cardiovascular Support	2,730	10	3.7

*2025 data is partial (January to mid-August).

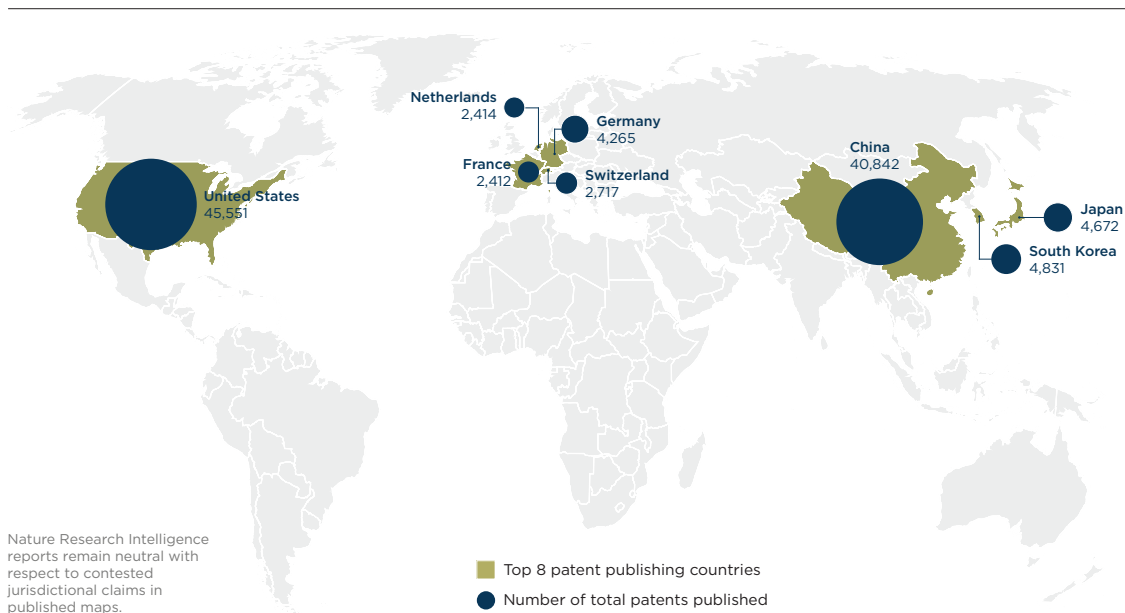


FIGURE 9

Global map of world-leading hotspots for innovation on 'Systems of Life' (2020-2025*)

* 2025 data is partial (January to mid-August).

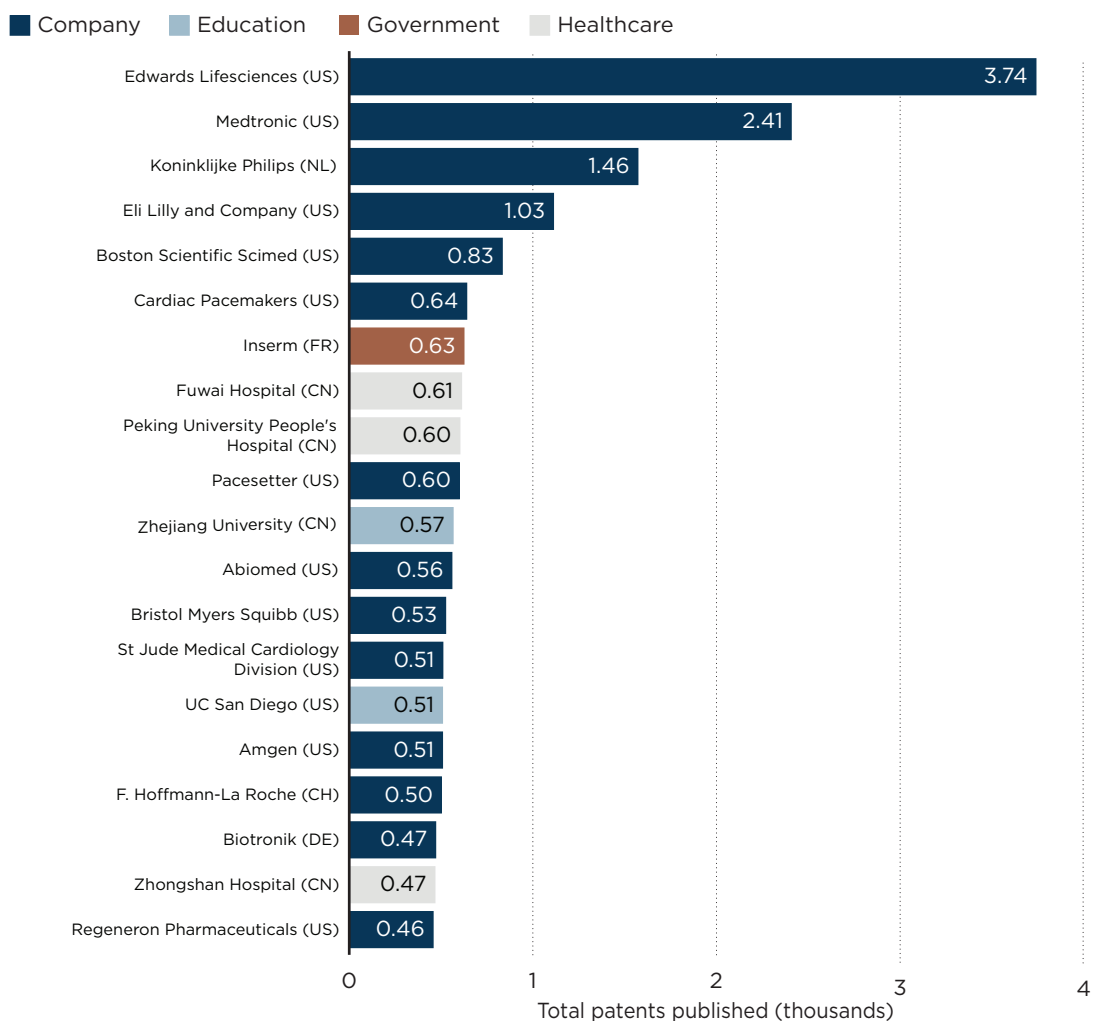


FIGURE 10

Leading organizations from the top eight patent publishing countries by total patents published for 'The Powerhouse' (2020-2025*)

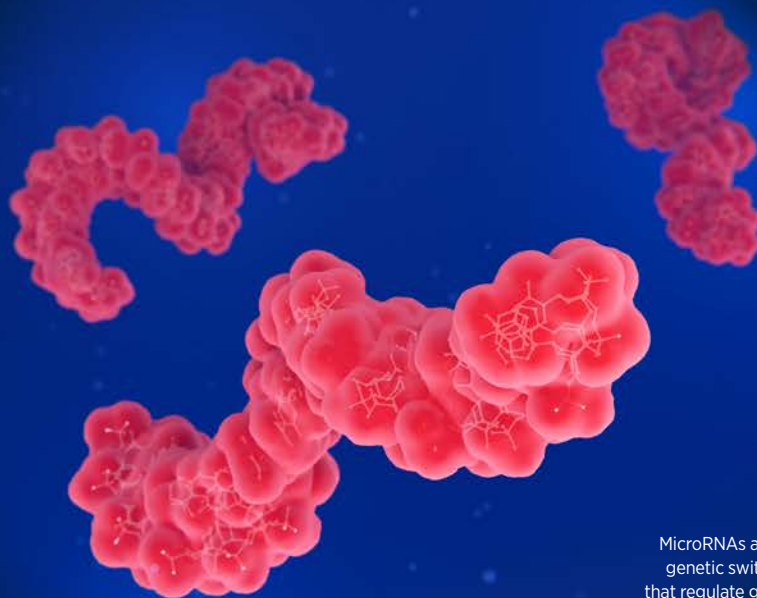
* 2025 data is partial (January to mid-August).

DE - Germany; CH - Switzerland; CN - China; FR - France; NL - Netherlands; US - United States

This figure displays the leading patent assignees from the top eight patent publishing countries for 'The Powerhouse'.

Genetic Snippets Give Clues on Hidden Heart Disease Risk

Tiny RNA molecules may flag the early signs of heart disease in people at high risk.



MicroRNAs act as genetic switches that regulate genes and have links to some diseases.

People living in the UAE are often at particularly high risk of cardiovascular disease (CVD). Many indoor workers are vitamin D deficient, more than 30% of the adult population is obese compared to 13% globally, and 20% have diabetes—all risk factors for heart disease.

Embarking on treatments and lifestyle changes early has lifesaving potential, but existing methods for detecting the early signs of CVD, such as measuring the flexibility of blood vessels, use techniques that are not widely available.

A team led by researchers at the University of Sharjah in the UAE may have found a simpler way. They've identified several microRNAs circulating in the blood of vitamin D deficient, obese, and diabetic Emirati people that could act as an early warning sign of CVD.

The study is an example of heart-related research in the Emirate of Sharjah identified in an analysis by Nature Research Intelligence (see page 9).

MicroRNAs are snippets of genetic material that don't code for protein. First thought to be an oddity of worms, the study of microRNAs exploded in

the early 2000s, when researchers realized that they act as genetic switches in many species including humans. Each one regulates tens or hundreds of genes, and many have links to a range of diseases.

“Four microRNAs were possible biomarkers for early vascular damage.”

The team—which includes researchers from University Hospital Sharjah, American University of Sharjah, and Istinye University, Istanbul, Turkey—compared three groups of middle-aged Emirati people: healthy individuals, those who were both vitamin D deficient and obese, and a small group who were vitamin D deficient, obese and had diabetes. None of the participants had been diagnosed with CVD or peripheral vascular disease or had shown symptoms.

Using a technique called pulse wave velocity (PWV) to measure blood vessel

stiffness, the researchers found that it was significantly higher in both vitamin D deficient groups—an early sign of CVD even though none of them had any disease symptoms. The diabetic group had the stiffest blood vessels.

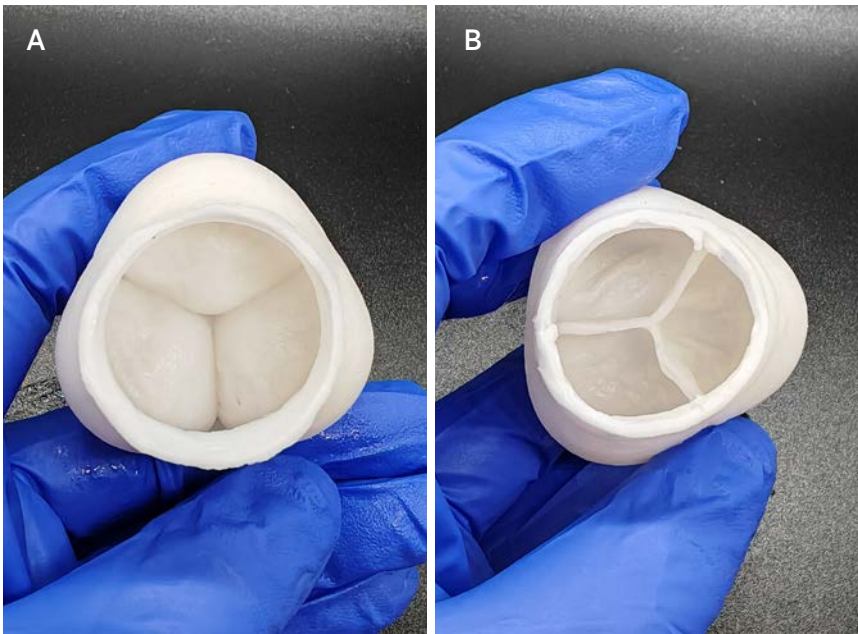
Snapshots of all the RNA in the blood of the participants showed how the microRNA profiles differed between the groups, and between those who had early signs of CVD according to the PWV measures and those who did not. Four microRNAs were identified as possible biomarkers for early vascular damage in high-risk patients.

The researchers call for larger studies to assess the potential of microRNAs as tools for monitoring a person's vascular health and for diagnosing early CVD. They also noted that research is needed to understand the precise role of vitamin D deficiency in CVD in the Emirati population.

Elmoselhi, A.B. *et al.* Circulating microRNAs as potential biomarkers of early vascular damage in vitamin D deficiency, obese, and diabetic patients. *PLoS ONE*, **19** (12): e0315309, 2024.

The Magdi Yacoub Tissue Engineered Valve—An Evolutionary Tale

Tissue engineering can provide off-the-shelf cardiac valves that remodel into living valves when implanted avoiding complications of current replacement valves.



(A) Annular view of the valve and (B) distal view of the valve.

More than 300,000 people require heart valve replacements each year. Despite the process being the only effective form of treatment for valve diseases, available inert heart valve substitutes have significant drawbacks. Mechanical valves require anticoagulants, posing bleeding risks, lifestyle limits, and exclude women of childbearing age. Bioprosthetic heart valves minimize these problems and improve haemodynamics, but they suffer structural deterioration, with reoperation rates significantly increasing after 10 years post-implantation, reaching 10–40% between 10 and 20 years.

The Magdi Yacoub tissue engineered valve is designed to overcome these limitations and is the result of decades of clinical, imaging, and experimental studies showing that native heart valves'

“The sinus wall of the scaffold was fully cellularized by six months post-implantation.”

sophisticated functions translate into prolonged survival and better quality of life. These functions depend on the viability of the valve and its capacity to change size and shape during the cardiac cycle. Scaffolds which are cellularized prior to implantation have many practical and ethical problems which we avoid.

We have used the concept of *in situ* tissue engineering utilizing an acellular PCL scaffold to recruit cells directly from the body, using the body as the bioreactor to

create a living tissue engineered valve. Our scaffold has a specific shape and consists of jet-sprayed PCL nanofibres with a patented, integrated knitted support.

When tested in a large animal model (sheep), this resulted in a coordinated process of valvulogenesis. The sinus wall of the scaffold was fully cellularized by six months post-implantation. The cells recruited included ten different 'appropriate' cell types as well as components of the extracellular matrix. A notable feature of the valve included functional adipogenesis, vasculogenesis and neurogenesis in the sinus walls. All of these contributed to the sophisticated functions of the valve and its ability to respond and adapt to varying hemodynamic changes during health and disease. In addition, sympathetic innervation could contribute to anti-inflammatory and anti-calcification effects.

The valve function was defined by echo and MRI, which showed near normal flow characteristics with excellent function of the right ventricle. The process of cellularization was not complete in the leaflets which did not include the integrated knitted support. This is currently being addressed in a new series of experiments. These results are encouraging and justify starting clinical application in the near future.

Yacoub M.H., Tseng Y.T., Kluin J., Vis A., Stock U., Smail H., Sarathchandra P., Aikawa E., El-Nashar H., Chester A.H., Shehata N., Nagy M., El-Sawy A., Li W., Burriesci G., Salmons-Smith J., Romeih S., and Latif N., Valvulogenesis of a living, innervated pulmonary root induced by an acellular scaffold. *Commun Biol.*, **6** (1), 1017, 2023.



Sir Magdi Yacoub, Director of Research, Magdi Yacoub Institute Heart Science Centre, Harefield Hospital, UK; Chief Scientific Officer, Heart Biotech; Emeritus Professor of Cardiothoracic Surgery, Imperial College London.

SHARJAH IN NUMBERS

SYSTEMS OF LIFE

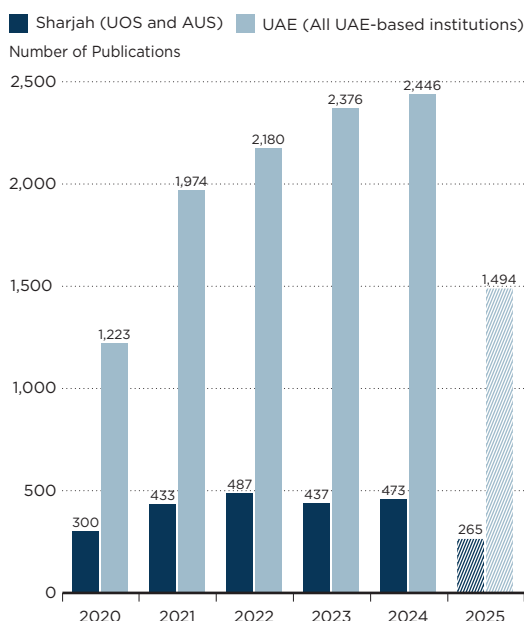
From tackling pandemic-level threats to advancing treatments for high-burden diseases, the ‘*Systems of Life*’ theme—one of the three pillars of *Sharjah Next: Healthcare*—highlights the transformative potential of revolutionary diagnostics and therapies. It explores research breakthroughs aimed at improving health and wellbeing, including innovations such as mRNA vaccines, CRISPR gene editing, and AI-driven medical imaging. It encompasses cutting-edge studies in cancer therapies, immunotherapies, and communicable disease solutions—reflecting the critical role of technological and scientific innovation in shaping the future of medicine.

Research publication and citation trends for Sharjah and the UAE

Sharjah and the UAE record double-digit publication growth in research associated with the ‘*Systems of Life*’ theme. Between 2020 and 2024, publications from Sharjah’s UOS and AUS increased at a CAGR of 12.1%. Meanwhile, UAE-affiliated institutions saw a publication CAGR of 18.9%, climbing to 2,446 publications in 2024 (Figure 11). Over the analysed period, UOS and AUS comprised a 20.5% share of the national output—an outsized contribution relative to neuroscience and cardiovascular research, highlighting the regional efforts being made to unearth disruptive health innovations.

UOS and AUS have produced 2,395 publications related to the ‘*Systems of Life*’ theme, generating more than 40,000 citations since 2020—an average of 17.5 citations per publication. Notably, 22.5% (540) of these outputs ranked in the world’s top 10% most cited publications, and 2.5% (61) appear in the top 1%. Among this most influential work, COVID-19 research dominated—exploring the management of the disease (e.g., genomic surveillance, risk factors) and its psychological impacts (e.g., mental health, stress, sleep patterns). This focus on the psychological dimensions of COVID-19 mirrors Sharjah’s top 1% most cited neuroscience research, where the pandemic’s effects on stress, mental health, and sleep also stand out. In the top 10% most cited studies, infectious diseases and cancer cell therapies feature prominently, alongside investigations into the use of AI for improved cancer detection.

The citation performance of UAE-affiliated research in the ‘*Systems of Life*’ theme surpasses that of the other key themes—averaging 15.6 citations per publication, compared with 12.2 for cardiovascular research and 12.1 for neuroscience. More than a fifth of these outputs (22.1%, or 2,588) rank among the world’s top 10% most cited, while



* 2025 data is partial (January to mid-August) and excluded from CAGR calculations.

3.1% (365) were in the top 1%, highlighting the global influence of this work.

‘Hot’ research topics in Sharjah and the UAE

‘*COVID-19 Research and Impacts*’ finds itself as the leading NRI topic for Sharjah and the UAE, ranked by publication volumes (Table 5). Given the significant urgency for translational research during the pandemic, it is perhaps foreseeable that four of the leading 10 topics listed here relate to COVID-19. Equally, it is understandable that the research production across these COVID-19 topics is forecast to tail off in the years ahead.

Research Spotlight #4—UAE: One of the UAE’s most cited publications on ‘*Anti-Inflammatory and Antioxidant Properties of Plant-Derived Compounds*’ investigates the therapeutic potential of myrrh; a resin long used in traditional medicine. Researchers from the UAE and Saudi Arabia identified nine active metabolites in a methanolic myrrh extract and tested its effects in-vitro on leukemia, breast cancer, and immune cell lines. The extract showed moderate cytotoxicity and promoted macrophage polarization and apoptosis—key mechanisms for resolving inflammation and targeting cancer. In-vivo tests in rats demonstrated improved wound healing without triggering inflammation. These findings highlight myrrh’s potential as a safe, multifunctional treatment for cancer, inflammatory conditions, and tissue repair.

Suliman, R.S., et al. *Pharmaceuticals*, **15**(8), 944, 2022.

For the UAE, ‘*Anti-Inflammatory and Antioxidant Properties of Plant-Derived Compounds*’ records the highest forecasted publication growth over the next

FIGURE 11

Yearly publications related to the theme ‘*Systems of Life*’ (Sharjah vs. UAE, 2020-2025*)

three years (56%). This topic is characterized by studies on anti-cancer therapeutics, with a particular focus on using plant-based polyphenols and alkaloids in the fight against breast and liver cancers.

Research collaborations involving Sharjah and UAE-based institutions

Egypt is the top international collaborator for Sharjah's UOS and AUS (457 publications), accounting for 19.1% of their total output on this theme (Figure 12). Saudi Arabia ranks second with a 14.9% share, followed by the UK with 14.2%. In contrast, Egypt represents just 11.6% of the UAE's 'Systems of Life' publications, ranking fifth. The US leads as the UAE's top international research partner on this theme, with a 17.6% share.

A landscape of the international institutions collaborating with Sharjah and the UAE on 'Systems of Life' research shows that Sharjah's UOS and AUS have partnered most frequently with the Jordan University of Science and Technology (157 publications) and the University of Jordan (124) (Figure 13a). Meanwhile, King Saud University (383) and Cairo University (288) lead international partnerships with UAE-based institutions (Figure 13b).

Globally leading topics in innovation research

Following a similar trend to Sharjah and the UAE, 'COVID-19 Research and Impacts' is the highest-ranking NRI topic based on global research output since 2020, generating close to 19,000 publications (Table 6). Given the significant publishing history in this topic, it also leads by a measure of total patent citations (7,366).

When it comes to innovation impact, 'COVID-19 Research and Impacts' remains the frontrunner, with 394.1 patent citations per 1,000 publications. 'Chimeric

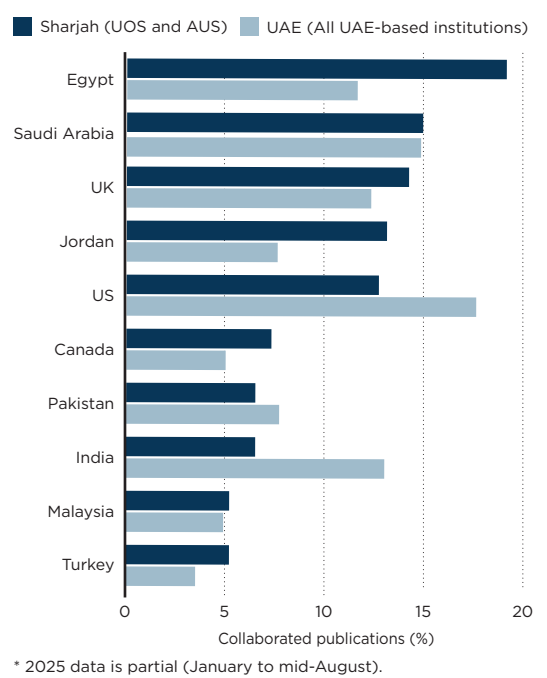


FIGURE 12

Sharjah's top 10 international collaborators on 'Systems of Life', benchmarked against the UAE's (2020–2025*)

Antigen Receptor T-Cell Therapy in Hematologic Malignancies' also stands out as being highly innovative (365.8), as does 'Immunotherapy in Lung Cancer' (110.8). Given Sharjah and the UAE's relatively limited footprint in both areas (see Table 5), there appears to be a strategic opportunity to strengthen innovation capabilities by cultivating collaborations with the key global players in these topics.

World-leading innovation hotspots

China and the US lead global patent activity in 'Systems of Life' innovation and technology, accounting for nearly two-thirds (65.5%) of all

NRI Topics	UAE			Sharjah	
	Total Publications	Average Citations	3-year Forecasted Growth (%)	Total Publications	Average Citations
COVID-19 Research and Impacts	713	26.9	-177	174	33.4
COVID-19 Epidemiology and Mathematical Modelling	291	14.0	-16	39	8.7
Artificial Intelligence in Medical Imaging and Diagnosis	239	21.7	0	49	20.0
Impact of COVID-19 on Mental Health and Wellbeing	225	42.5	-191	51	34.8
Anti-Inflammatory and Antioxidant Properties of Plant-Derived Compounds	187	13.0	56	42	8.1
Nanoparticle-Based Drug Delivery Systems for Cancer Therapy	174	27.1	50	89	25.4
Financial Markets and Price Dynamics	157	29.8	-48	10	17.1
COVID-19 Vaccination and Vaccine Hesitancy	144	26.3	-183	30	13.0
Periodontal Disease Research	142	6.7	37	50	9.8
Nanoparticles in Biomedical Applications and Toxicity	131	16.3	4	45	19.7

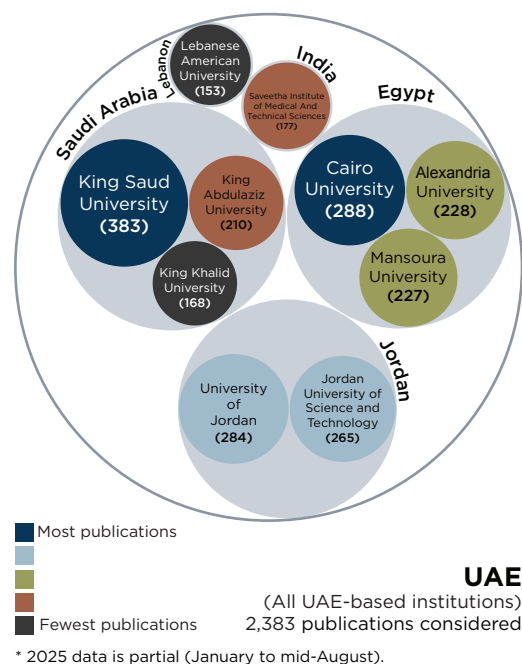
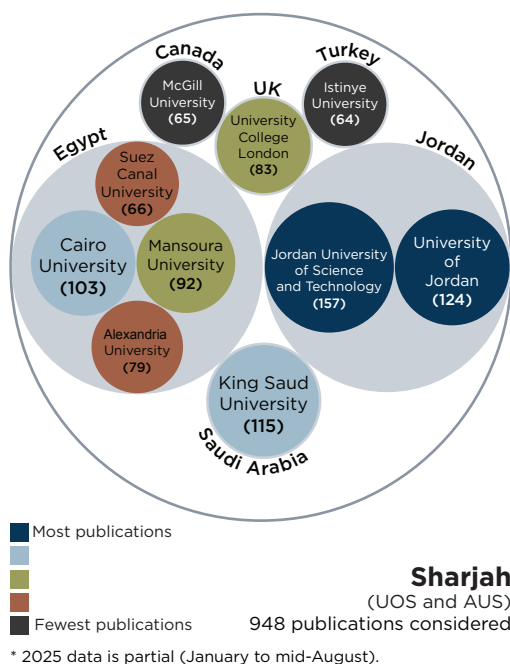
TABLE 5

Hot topics of 'Systems of Life' research (UAE vs. Sharjah, 2020–2025*)

*2025 data is partial (January to mid-August). The 3-year forecasted growth (%) is calculated using a drift method to predict publication volumes for 2025, 2026 and 2027.

FIGURE 13A&B

Top 10 International Institutions Sharjah and the UAE collaborate with on 'Systems of Life' (2020-2025*)



patents published since 2020—over 370,000 in total. Japan (28,367), South Korea (23,236), and Germany (20,968) round out the top five (Figure 14). Among emerging innovation hotspots, Thailand (39.4%), Saudi Arabia (28.7%), and Turkey (20.7%) are driving the highest growth rates in published patents over the analysed period.

Providing visibility into the key patent assignees behind these numbers can help inform Sharjah's future collaboration strategy and spark innovation. Of the top 50 patent assignees, by patent volume since 2020, 23 were from the corporate sector, 18 from academic institutions, 6 from healthcare organizations, and 3 from government departments. The top five patent assignees in 'Systems of Life' innovation include

four pharmaceutical or biotech companies—F. Hoffmann-La Roche (3,619, Switzerland), Regeneron Pharmaceuticals (3,294, US), Novartis (2,923, Switzerland), and Genentech (2,809, US)—alongside Inserm (3,298, France), a leading public research institute (Figure 15).

When ranked by growth rate (CAGR) of patents published since 2020—a proxy for innovative dynamism—the top five global assignees include a greater proportion of universities and healthcare organizations: King Faisal University (225.3%, Saudi Arabia); Jiangsu Hengrui Pharmaceutical Co Ltd (191.8%, China); First Medical Center of PLA General Hospital (187.2%, China); First Affiliated Hospital of Naval Military Medical University of PLA (182.8%, China); and InSilico Medicine IP Ltd (165.9%, China).

TABLE 6

Leading topics in 'Systems of Life' innovation research (Global, 2020-2025*)

NRI Topics	Global		
	Total Publications	Total Patent Citations	Patent Citations per 1,000 publications
COVID-19 Research and Impacts	18,690	7,366	394.1
Immunotherapy in Lung Cancer	17,689	1,960	110.8
Artificial Intelligence in Medical Imaging and Diagnosis	15,042	393	26.1
COVID-19 Epidemiology and Mathematical Modelling	11,247	160	14.2
HIV/AIDS Prevention and Treatment Strategies	7,922	21	2.7
Prostate Cancer Research	7,091	280	39.5
Glioblastoma Multiforme and High-Grade Gliomas	6,809	283	41.6
Chimeric Antigen Receptor T-Cell Therapy in Hematologic Malignancies	6,107	2,234	365.8
Digital Pathology and Deep Learning in Histopathology	5,999	412	68.7
Brain Tumour Imaging and Segmentation Techniques	5,646	121	21.4

*2025 data is partial (January to mid-August).

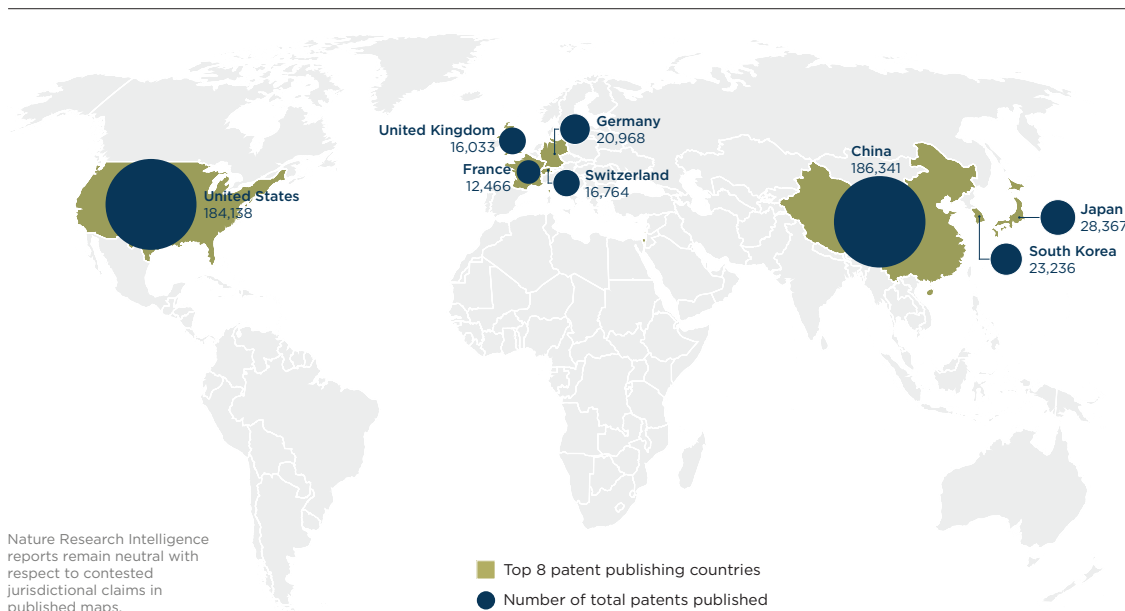


FIGURE 14

Global map of world-leading hotspots for innovation on 'Systems of Life' (2020-2025*)

* 2025 data is partial (January to mid-August).

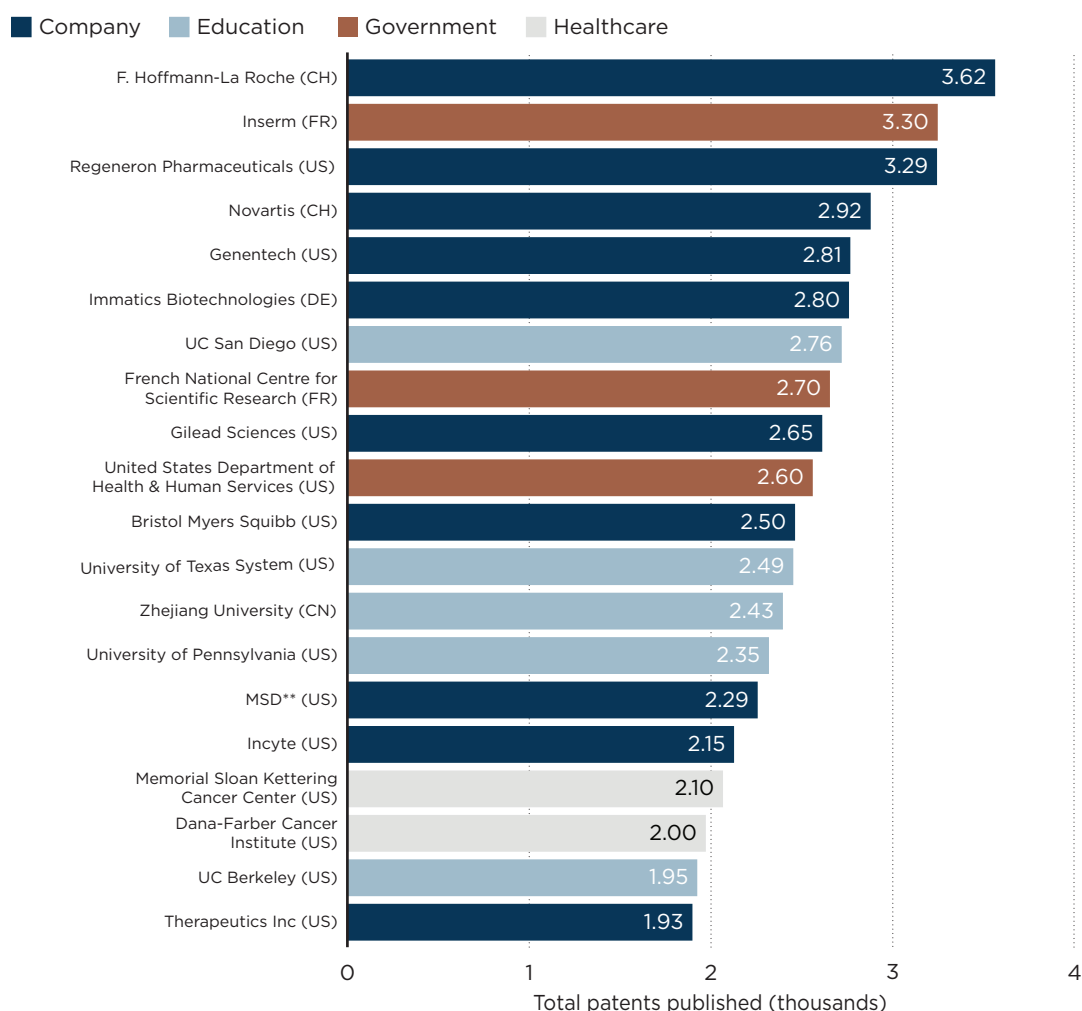


FIGURE 15

Leading organizations from the top eight patent publishing countries by total patents published for 'Systems of Life' (2020-2025*)

* 2025 data is partial (January to mid-August).

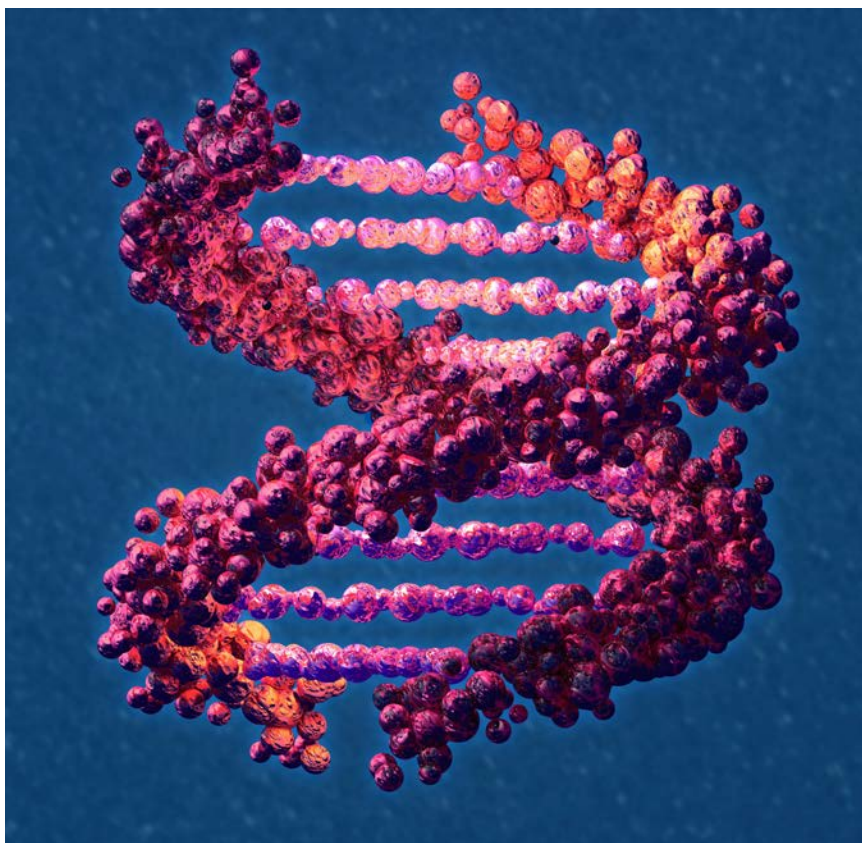
** Merck Sharp & Dohme (known as Merck & Co. in the US and Canada).

CH - Switzerland; CN - China; DE - Germany; FR - France; US - United States

This figure displays the leading patent assignees from the top eight patent publishing countries for 'Systems of Life'.

Genetic Technique Gives Faster Read on Rare Diseases

Advanced genomic analysis combined with data filtering provides a fast one-stop shop for rapid diagnosis of rare genetic diseases.



Long-read sequencing combined with a UAE-developed data analysis method could offer a single test to speed up rare disease diagnosis.

Rare genetic diseases could be diagnosed and, potentially, treated much earlier in life thanks to a powerful method that combines an advanced method of genetic sequencing with a data analysis technique developed by UAE researchers. The study was identified in an analysis by Nature Research Intelligence of UAE diagnostics and therapeutics research (see page 15).

The method merges long-read genome sequencing with a smart data filtering strategy to rapidly identify disease-causing errors in each patient's DNA. What makes

the technique so effective is its ability to detect a wide range of genetic changes. These include tiny mutations in the DNA code, called single nucleotide variants; epigenetic changes, which change gene activity without altering the DNA sequence; and large-scale changes in chromosome structure.

The new method, developed by a team led by Ahmad Abou Tayoun of the Centre for Genomic Discovery, has already had impact: during the study, one patient was diagnosed with a treatable, potentially fatal

spinal muscular atrophy (SMA) that had been missed using conventional techniques.

Most rare diseases are due to genetic changes which disrupt the body's ability to make proteins that are essential for cells to function. Although symptoms typically appear early in life, it takes an average of six years for a rare disease to be diagnosed, often delaying critical treatment. One problem is that different tests need to be run to detect the different types of genetic change. Even then, the short-read sequencing techniques that are currently used may miss more complex disease-causing genetic changes due to the way the DNA is broken up into small pieces to enable it to be read.

Long-read sequencing could offer a single test to speed up rare disease diagnosis. Because the technique reads a patient's genetic code in long intact strands, rather than fragmenting it first, genetic variants missed by short read sequencing can be detected.

To make sense of the huge volume of genetic information collected from each patient when long-read sequencing is deployed, the team developed a data strategy called funnel down filtering to distinguish harmless gene variants from disease-causing ones. The sequential data filtering steps included narrowing in on variants that affect known disease-causing genes and discarding variants that are not unique to each patient.

In a test run, the analysis correctly diagnosed more than 100 patients with a range of known rare diseases. When applied to 51 patients whose condition had defied diagnosis by conventional genetic analysis, the long-read genome sequencing combined with the funnel-down filtering strategy was able to provide a diagnosis for 10% of the patients—including the patient with treatable SMA.

Long-read genome sequencing combined with the UAE-developed data analysis method could mark a turning point in how—and how quickly—rare genetic disorders are diagnosed, giving children a better chance at timely treatment and improved quality of life.

Sinha, S. *et al.* Long read sequencing enhances pathogenic and novel variation discovery in patients with rare diseases. *Nature Commun.*, **16**, 2500, 2025.

mRNA Vaccine Revs Up Mouse Immune System to Thwart Evasive Cancer Cells

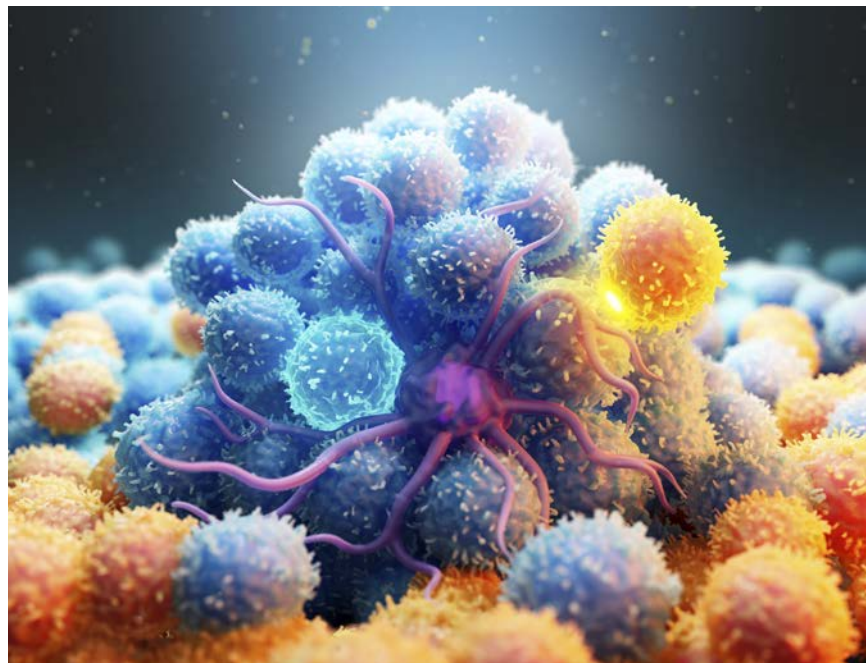
A surprise finding could lead to a universal vaccine that fights cancer by activating the body's tumour sensing system.

An experimental mRNA vaccine that triggers the immune system's damage detection response has shown remarkable promise in mice, prompting their immune system to recognize, attack—and in some cases, completely clear—tumors that had previously evaded immune detection and grown unchecked.

The finding reported by US researchers, suggests a potential path towards a universal therapy for cancers resistant to immunotherapy. The study is a striking example of global research on novel therapies identified in an analysis by Nature Research Intelligence (see page 15).

"This finding is a proof of concept that these vaccines potentially could be commercialized as universal cancer vaccines to sensitize the immune system against a patient's individual tumor," said Elias Sayour, from the University of Florida in Gainesville, who led the research.

Unlike many cancer vaccines that must be tailored to target specific mutations in a tumor, this new approach stimulates a



mRNA vaccines trigger an immune response against cancer tumors.

universal immune-system tumor-detection mechanism, suggesting potential as an off-the-shelf treatment.

This discovery emerged while Sayour and his team were investigating why anticancer immunotherapy drugs called immune checkpoint inhibitors (ICIs) work well for some patients but fail in others.

“Transferred activated immune cells initiated a potent anti-tumor response in the mice.”

The team hypothesized that ICI-resistant cancers were blocking a process called early interferon signaling, which works as part of a damage surveillance system, alerting immune cells to signs of infection or cancerous cell division.

In a series of experiments in mice, the researchers showed that blocking early interferon signaling shut down the effectiveness of ICI drug treatment in animals with usually-ICI-responsive tumors.

Next, they transferred immune cells from mice responding strongly to ICI therapy into mice with ICI-resistant tumors, bypassing the resistant tumors' interferon suppressing effect. The transferred activated immune cells

initiated a potent anti-tumor response in the mice. The benefits were lost if the cells came from mice in which early interferon signaling had been blocked.

Building on these findings, the researchers created an mRNA vaccine encoding proteins that trigger a strong interferon signaling response in mice and tested whether it stimulated an immune response against ICI-resistant cancers.

When administered to mice with resistant skin, bone, or brain tumors, the vaccine enabled successful treatment with ICIs. Strikingly, the cancer vaccine alone stimulated an immune response strong enough to eradicate the tumor in some mice.

"By using a vaccine designed not to target cancer specifically but rather to stimulate a strong immunologic response, we could elicit a very strong anticancer reaction," said Duane Mitchell, a co-author of the paper. The finding "has significant potential to be broadly used across cancer patients—even possibly leading us to an off-the-shelf cancer vaccine," he said.

The next step will be to develop an mRNA cancer vaccine suitable for human testing.

Qdaisat, S. *et al.* Sensitization of tumours to immunotherapy by boosting early type-I interferon responses enables epitope spreading. *Nature Biomed. Eng.*, **9**, 1437-1452, 2025.



SOILab empowers researchers and students with advanced prototyping tools.

FEATURE

Sharjah Research, Technology and Innovation Park: Shaping the Future of Healthcare R&D

A thriving knowledge economy and collaboration between diverse sectors fuels unique opportunities for innovation.

Since its launch, the Sharjah Research, Technology and Innovation Park (SRTIP) in Sharjah, UAE, has attracted multinational corporations, supported regional startups, and provided a hub for research-driven enterprises across diverse sectors. Embedded within Sharjah's vision for a thriving knowledge economy, SRTIP complements world-class institutions such as the University of Sharjah, the

American University of Sharjah, and Sharjah University Hospital. Acting as a vital bridge to industry and society, it strengthens the continuum of education, research, and clinical practice. Today, SRTIP is both a driver of emerging technologies and a testbed for future industries, promoting inclusivity, and global partnerships across healthcare, sustainability, advanced manufacturing, and mobility.

Expanding Strategy: An R&D Hub Across Multiple Sectors

SRTIP's current strategy positions it as an R&D hub spanning multiple sectors. While healthcare is a cornerstone, the park's scope extends to advanced manufacturing, mobility, transportation, sustainability, and digital technologies. This broad focus reflects a deliberate approach: that solutions to the world's greatest challenges often emerge at the intersection of disciplines.

As Dr. Fareed Al Amiri, Chief Strategy Officer, observed, "The strength of SRTIP lies in its ability to break silos. By creating an environment where sectors collaborate—biotechnology with artificial intelligence, or clean energy with smart mobility—we enable the kind of breakthroughs that single-discipline research cannot achieve."

This cross-sectoral strategy has made SRTIP a magnet for global partners seeking a testbed for applied research and real-world innovation.

Central to this vision is the Sharjah Open Innovation Lab (SOILab), the leading UAE prototyping lab. SOILab

offers entrepreneurs, researchers, and students access to a comprehensive prototyping platform offering a wide range of facilities such as 3D printing, robotics, and electronics—resources that turn ideas into prototypes and prototypes into scalable solutions.

In healthcare, SOILab has become a catalyst for medical technology innovation. A flagship collaboration with a UAE-based telehealth company has led to the design and fabrication of mobile clinics, equipped with diagnostic tools and telemedicine capabilities, to bring healthcare services closer to underserved populations. Additional projects include 3D-printed devices to support critical surgery procedures, robotic prosthetics, wearable health monitoring devices and AI-enabled diagnostic systems, demonstrating SOILab's ability to accelerate patient-centered solutions.

As Nicola Bettio, director, Innovation and Research Ecosystem, said: "SOILab is an advanced prototyping platform supporting researchers, students and startups to enhance proofs-of-concept into industry-grade prototypes. By partnering with established companies, we are accelerating the pace of innovation



Lab work channels innovation into patient-centered healthcare solutions.

and giving healthcare projects a pathway from concept to impact."

In few years, SOILab has become the UAE reference for innovators to experiment rapidly, refine their models, and scale into viable businesses—all feeding directly into Sharjah's larger innovation ecosystem.

Toward the Heart of Healthcare Innovation

Today, SRTIP is more than a science park, it is the engine of Sharjah's innovation story. Its model of uniting academia, government, and industry under one collaborative

umbrella is transforming the emirate into a testbed for globally relevant solutions.

For healthcare in particular, the trajectory is unmistakable. Through open innovation spaces, international partnerships, and an expanding biotech cluster, SRTIP is emerging as the heart of healthcare innovation in Sharjah.

As Hussain Al Mahmoudi, SRTIP's CEO, summarized, "We are building more than infrastructure; we are building opportunity. Our mission is to nurture ideas and talent that can change industries—and ultimately improve lives."

Looking ahead, Dr. Asma Mahmoud Fikri, Director of Government and Corporate Partnerships, who leads the healthcare initiatives reflects the broader sentiment: "SRTIP is rapidly evolving into a hub for healthcare innovation in the region. By attracting global partners and enabling local talent, it is creating the foundations for a sustainable and globally relevant healthcare ecosystem."

From mobile clinics to biotech breakthroughs, from sustainable labs to global collaborations, SRTIP demonstrates how a vision launched in 2016 is now shaping a healthcare future in which Sharjah is not just participating, but leading.

How the Jawaher Boston Medical District Leads Holistic Wellbeing in the Emirate of Sharjah

An emerging healthcare destination, the hospital is being designed to meet today's challenges and serve coming generations.

In a rapidly developing area of Sharjah, UAE, a planned medical ecosystem will deliver tech-enabled holistic healthcare to the residents of the emirate and beyond. Nestled within a lush forest and encircled by thousands of trees, the upcoming



Khaled Al Huraimel, Vice Chairman & Group CEO, BEEAH Group, UAE.

Jawaher Boston Medical District is the city's latest healthcare initiative. This state-of-the-art hospital is an ambitious undertaking, led by the UAE-based sustainability and innovation pioneer BEEAH, in collaboration with Mass General Brigham and Dana-Farber Cancer Institute in Boston, United States, alongside architectural firm Renzo Piano Building Workshop (RPBW).

Sharjah serves as the hospital's strategic stronghold—a city increasingly

emerging as a regional beacon in MENA for the latest in health sciences. Key stakeholders, focused on this healthcare push, are eagerly collaborating to harness the growing potential of medical research and innovation across the city. This year, BEEAH and the Sharjah Research, Technology and Innovation Park (SRTIP) signed a partnership to establish a healthcare R&D hub in the emirate. As research accelerates within the hub, key medical findings are expected to seamlessly integrate with the Jawaher Boston Medical District. This landmark collaboration has also laid the foundation for Sharjah Next: Healthcare, a flagship health and biotech event, where the upcoming hospital is set to take center stage.

The Jawaher Boston Medical District recognizes the increasing need to treat illnesses holistically. By combining critical specialties within a nurturing environment, it will embrace an all-encompassing approach to well-being that bridges physical, mental, and social health. ►

The Jawahar Boston Medical District in an artist's impression.

- **Lifestyle Medicine and Prevention** will provide support for managing chronic diseases, from addressing nutrition and weight management to smoking cessation and asthma care.
- **Oncology** will comprise medical and surgical oncology, and radiotherapy, offering comprehensive cancer care from diagnosis through to survivorship. Patients will benefit from advanced treatments, including genomics-guided immunotherapy.
- **Women's Health** will extend beyond reproductive care to address cardiovascular health, rheumatology, immunology and other issues that uniquely or disproportionately impact women.
- **Pediatrics** will provide medical and surgical care, including

adolescent health services in obesity, hypertension and diabetes treatment.

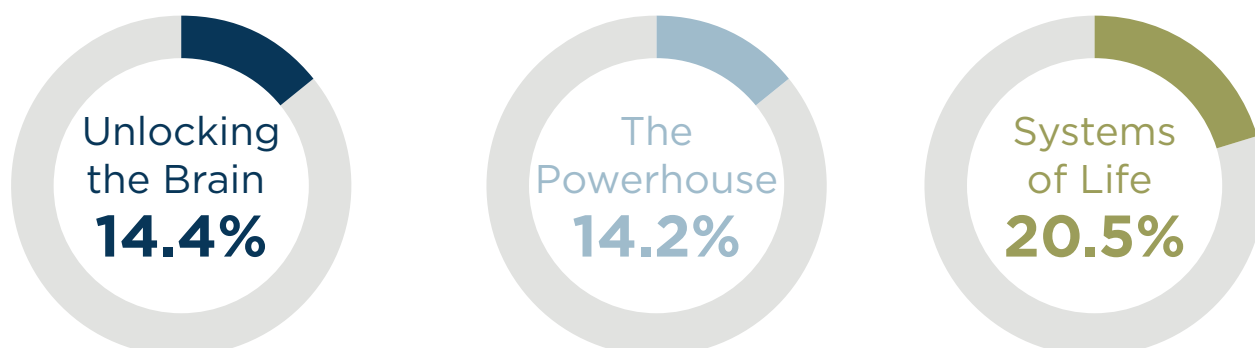
- **Cardiovascular** will span surgery, intervention and intensive care, focusing on in-demand minimally invasive procedures.
- **Neurosciences** will be focused on providing acute care treatment for neurological conditions, including strokes, dementia and inborn metabolic diseases.
- **Behavioral Health** will provide psychiatry, psychology and addiction services as an integral part of primary care, with a strong emphasis on public education and community outreach.
- **Rehabilitation Medicine** will support recovery and improve quality of life for conditions

in musculoskeletal health, neurosciences, cardiovascular disorders, oncology and general rehabilitation.

The hospital will also harness restorative surroundings to enhance patient care. The RPBW-designed buildings are surrounded by a dense forest to create a cooling microclimate, lowering the temperatures by up to 4°C. Overhead, a photovoltaic canopy will provide clean energy, significantly contributing to the hospital's net-zero status.

Within this calm, daylight-infused environment, the Jawahar Boston Medical District will bring modern healthcare and healing closer to home, ensuring that the residents of Sharjah have access to cutting-edge medicine, sustainable innovations, and holistic care within their community.

CONCLUSION



* 'Sharjah' refers to publications affiliated with the UOS and AUS; UAE refers to all UAE-based institutions.
 ** 2025 data is partial (January to mid-August).

Sharjah's UOS and AUS are making an outsized contribution to the UAE's research output across all three themes of *Sharjah Next: Healthcare*. A case in point is its impressive 20.5% share of UAE publications for 'Systems of Life' research. This is no mean feat, especially given the 187 organizations that are affiliated to the UAE in *Dimensions*. Sharjah's involvement in the national research landscape for 'Unlocking the Brain' and 'The Powerhouse' is also noteworthy, with a 14.4% and 14.2% participation respectively (Figure 16).

Research landscape

Across all themes, the psychological effects of the COVID-19 pandemic have dominated recent research at Sharjah's UOS and AUS, as well as other UAE-based institutions. However, as the pandemic fades into memory, new research frontiers are emerging. In the UAE, emerging research momentum is particularly strong in areas focused on neurodegenerative disorders (e.g., multiple sclerosis, Alzheimer's disease), cardiovascular-related conditions (e.g., non-alcoholic fatty liver disease), and cancer therapies (anti-inflammatory properties of plant-derived compounds). By strengthening partnerships with some of the UAE's key international collaborating institutions, such as King Saud University in Saudi Arabia, and Cairo University in Egypt, Sharjah's universities can position themselves for greater impact in these 'hot' topics. Notably, UOS and AUS already maintain strong ties with leading global institutions, including the University of Oxford, University College London, McGill University, Cornell University, and Johns Hopkins University. Expanding these relationships will be critical to advancing Sharjah's research agenda.

Innovation hotspots

In innovation and translational research across brain, heart, and the broader human body, a consistent pattern emerges: China and the US dominate global activity, both in patent volumes and in shaping future technological trajectories. South Korea, Japan, and Germany consistently feature among the top five, reinforcing their status as established innovation hubs. Meanwhile, emerging markets such as Thailand, India, Saudi Arabia, and Turkey are rapidly accelerating their patent output, making them attractive partners for forward-looking collaboration.

At the institutional level, the innovation ecosystem is driven by a mix of leading corporates in technology and pharmaceuticals (e.g., Boston Scientific, Koninklijke Philips, F. Hoffmann-La Roche, Eli Lilly and Company) and research-intensive universities and hospitals (e.g., Zhejiang University, University of California San Diego). Together, they represent the full translational pipeline from discovery to applied innovation.

Common across all themes is the growing role of AI, precision diagnostics, and digital health technologies, which underpin advances in brain imaging, cardiovascular prediction, and personalized treatment strategies. For Sharjah, the path forward is clear: strengthen ties with top innovation geographies (China, US, South Korea, Japan, Germany), forge new collaborations with fast-growing hubs (Thailand, India, Saudi Arabia, Turkey), and engage with both corporate leaders and high-growth academic medical institutions to build a resilient and future-ready innovation ecosystem.

These findings reveal clear opportunities for future research collaboration, innovation, and real-world impact—both regionally and globally.

FIGURE 16

Sharjah's* publication share of UAE output for each theme (2020-2025**)

METHODS

Thematic datasets

Sourcing academic research outputs from *Dimensions*, each theme of *Sharjah Next: Healthcare* housed three separate datasets—curated through applying *Dimensions*’ RCDC filters and a keyword search of theme-related terms across titles and abstracts. A summary of these thematic datasets by geography is provided in Table A1. Data for each theme were extracted in August 2025, covering the last 5.5 years (January 2020 to mid-August 2025).

Nature Research Intelligence (NRI) Topics

NRI Topics are drawn from our in-house AI citation topic model, which creates ‘citation networks’—clusters of research publications that either directly cite each other or have textual similarity. Each

group is named using an AI model (GPT-3.5 Turbo) and assigned to an appropriate NRI topic. Finally, the topics are organized into a four-level Field of Research (FoR) hierarchy taken from the Australian Bureau of Statistics.

To calculate topic growth, the drift method—a straightforward forecasting technique—was applied. This method assumes that changes over time follow a consistent linear pattern. For this analysis, quarterly publication data from the past four years (excluding the current year) was used, to determine the steady rate of growth or decline observed in the past, or ‘drift’. This value is then used to project outcomes over the next three years by extending the trend line, under the assumption that past patterns will continue.

Theme	Dataset	Output Type	Search Method	Total Publications	Total Patents
Unlocking the Brain	Sharjah (UOS and AUS)	Publications	RCDC* filters (e.g., Neurosciences, Brain Disorders, ALS, Depression, Alzheimer’s etc.) + Theme-related terms (e.g., neuron, nervous system, cognition etc.)	985	N/A
	UAE (All UAE-based institutions)	Publications		6,856	N/A
	Global Innovation (All institutions globally)	Publications and patents	RCDC* filters + Theme-related terms + Innovation-related terms (e.g., breakthrough, discovery, invention, novel approach etc.)	451,309	311,778
The Powerhouse	Sharjah (UOS and AUS)	Publications	RCDC* filters (e.g., Cardiovascular, Atherosclerosis, Heart Disease, Hypertension etc.) + Theme-related terms (e.g., cardiometabolic, vascular function, coronary heart failure etc.)	616	N/A
	UAE (All UAE-based institutions)	Publications		4,353	N/A
	Global Innovation (All institutions globally)	Publications and patents	RCDC* filters + Theme-related terms + Innovation-related terms (e.g., breakthrough, discovery, invention, novel approach etc.)	233,716	126,400
Systems of Life	Sharjah (UOS and AUS)	Publications	RCDC* filters (e.g., Cancer Immunotherapy, Immunization, Infectious Diseases etc.) + Theme-related terms (e.g., oncology, tumour, disease, immunotherapy etc.)	2,395	N/A
	UAE (All UAE-based institutions)	Publications		11,693	N/A
	Global Innovation (All institutions globally)	Publications and patents	RCDC* filters + Theme-related terms + Innovation-related terms (e.g., breakthrough, discovery, invention, novel approach etc.)	615,825	565,563

TABLE A1

Data curation methods by report theme

*RCDC is a computerized reporting system the National Institutes of Health (NIH) has used to categorize its funding in biomedical research since 2008. RCDC reports NIH funding in more than 300 research, condition, and disease categories.

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