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Recent improvements in the aesthetic industry

Jumana El Khoury Maalouf
Owner and CEO of Aesthetic Today

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MEDIWORLD Middle East

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Middle East, Africa and Asia & Beyond

MediWorld ME aims to create the ultimate platform to share the latest news, updates & developments from the healthcare & medical technology industry within & beyond the GCC countries

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What to expect in the digital healthcare industry in 2023

As digital healthcare continues to grow and evolve, it's important to stay up-to-date on the latest industry trends. The report by Statista predicts that the digital healthcare industry will be worth nearly 660 billion dollars by 2025, with a CAGR of 25 percent. That's a huge growth!

Tele-health, personalization and home assistance are just a few of the many technologies that have seen a boom during the pandemic and continue to grow even after it. This ease of access is benefiting both patients and doctors alike.

An increasing number of US adults used digital wearables to track their health in 2020. We found that the growth of medical sensors was higher than smartwatches, indicating that patients are more likely to use wearable health monitoring technology.

In addition to validating precision medicine solutions in test settings, several companies are providing precision medicine solutions to physicians and pharmaceutical companies. This indicates that this trend is in the late stages of clinical trials to early commercialization.

Furthermore, major healthcare companies like Roche, Novartis, Pfizer, Johnson & Johnson, etc. have started researching this technology.

But what is the reason behind the growth of this technology?

We know how digital technologies like artificial intelligence, machine learning, big data analytics, etc are used to analyze a patient's biological data. The rapid development in these areas is the major driving force behind the growth of Precision Medicine.

Apart from this, the other areas trending under Doctor's assistance are Remote Treatment for Surgeries/ Consultations and Healthcare Management.

The digital healthcare system has been a great help to both patients and doctors during the pandemic. It's clear that digital healthcare is here to stay and will revolutionize the medical industry. Many companies and startups are working on the upcoming trends in the industry. It will be interesting to watch how the industry grows in the coming years.

Happy New Year Everyone.

Sincerely,

Ayesha Rashid
Chief Editor, *MediWorld ME*

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References: 1. Data on file – Hi-Care Alcohol Antiseptic 80% Topical Solution Composition Formula. 2. World Health Organization - Guide to Local Production: WHO-recommended Handrub Formulations. April 2010. 3. FDA Policy for Temporary Compounding of Certain Alcohol-Based Hand Sanitizer Products During the Public Health Emergency Immediately in Effect Guidance for Industry. March 2020. 4. Data on file – Dubai Central Laboratory Report No: CR-600076509, 01/07/2020. 5. Nina A. Gold ; Taaha M. Mirza ; Usha Avva, Alcohol Sanitizer, NCBI Bookshelf, StatPearls Publishing; January 2020.
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Do not use : In children less than 2 months of age. On open skin wounds. When using this product keep out of eyes, ears and mouth.

In case of contact with eyes, rinse eyes thoroughly with water. Stop use and ask a doctor if irritation or rash occurs. These may be signs of a serious condition.

Keep out of reach of children. If swallowed, get medical help.

Directions : Place enough product on hands to cover all surfaces. Rub hands together until dry. Supervise children under 6 years of age when using this product to avoid swallowing.

Other information : Do not store above 30°C

Avoid freezing and excessive heat above 40°C.

References:

1. Data on file – Hi-Care Alcohol Antiseptic 80% Topical Solution Composition Formula.

2. World Health Organization - Guide to Local Production: WHO-recommended Handrub Formulations. April 2010.

3. FDA Policy for Temporary Compounding of Certain Alcohol-Based Hand Sanitizer Products During the Public Health Emergency Immediately in Effect Guidance for Industry. March 2020.

4. Data on file – Dubai Central Laboratory Report No: CR-600076509, 01/07/2020

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Recent improvements in the aesthetic industry

The global aesthetic medicine market size was valued at $99.1 billion in 2021 and is expected to expand at a compound annual growth rate (CAGR) of 14.5% from 2022 to 2030

Medical aesthetics is a branch of medicine that focuses on improving the physical appearance of patients. It is a professional and certified practice that is different from beauty treatments like eyebrow threading, waxing, or eyelash extensions. Some medical aesthetics treatments include microdermabrasion, chemical peels, skin rejuvenation, laser hair removal, and cosmetic surgery.

Along with hospitals, these types of treatments are now also being performed at aesthetic medicine clinics and medical spas by healthcare professionals, including plastic surgeons, dermatologists, physician assistants, and even aestheticians. The rising development of minimally invasive and non-invasive aesthetic procedures is primarily driving the demand for the medical aesthetics market.

The global aesthetic medicine market size was valued at $99.1 billion in 2021 and is expected to expand at a compound annual growth rate (CAGR) of 14.5% from 2022 to 2030. Manufacturers coming up with innovative aesthetic devices has led to an increased demand for aesthetic treatments in recent years. For instance, the introduction of technologically advanced products, such as non-invasive body contouring systems that use fat freezing technology, is expected to create lucrative opportunities for market growth in the coming years.

According to the Aesthetic Society (US), non-invasive body fat reduction was among the top 5 non-invasive procedures in the US in 2020 with 140,314 procedures being carried out (Grand View Research).

Key factors driving the growth of this market include the increasing popularity of non-invasive and minimally invasive aesthetic procedures, the rising demand among the elderly, the increasing public awareness of cosmetic procedures, the availability of technologically advanced and user-friendly products, and the growing interest in aesthetic treatments among men.

There are tremendous prospects in the medical aesthetics sector, and emerging markets like Brazil, Mexico and China are seizing a large portion of it. Growth in the over-20 population and greater familiarity with medical tourism are driving demand in these countries, as well as in India. The rise in personal wealth has also led to a boom in the number of medical professionals available to the public.

Jumana El Khoury Maalouf, Owner and CEO of Aesthetic Today discusses with Ayesha Rashid of mediworldme how the medical aesthetic industry has changed over the years.

The last decade has seen a meteoric rise in the popularity of medical aesthetic operations. There has been a rise in the number of service providers, such as doctors and surgeons, who are helping patients by favouring invasive and non-invasive aesthetic operations over more conventional methods, driving up demand at an alarming rate. There are a variety of benefits associated with these methods, including shorter downtime, reduced scarring, and improved quality of life. These methods are also less expensive.

Tell us in detail about your entrepreneurial journey in the UAE Aesthetic industry?

It's important to have a supportive network; no one succeeds alone. Maintaining relationships and participating in your local small business community are key. Social media is also important; and that is how most people communicate these days. Having the right mindset, setting goals, and facing fears and failures are all part of the process.

How are you adapting in today's competitive aesthetic market?

Our role as entrepreneurs to build a team of people who share their passion for and commitment to the company. Having a committed and motivated team is essential for any business - leaders and staff alike. In today's competitive market, being able to adapt, innovate, and make necessary changes is key to success. Our goal is to be able to address everyone's beauty and wellness concerns while they are in the comfort and safety of their homes, with the simple click of a button.

In your opinion how have the aesthetic industry evolved over the years?

There is no constant when it comes to the standard of beauty. What is considered ugly can become beautiful and vice versa. This is largely due to the media, celebrity influencers and the globalization of the world. With technology evolving, the beauty and skin care industry has had to adapt. Thanks to this adaptation, we've seen some amazing changes in recent years.

Key evolution that led to the evolvement in the industry?

The upstart e-commerce beauty hub believes now is the right time for the business to thrive. The situation is especially difficult and challenging for everyone, but for a business like ours, it is the time to grow and be aggressive. Targeting not just women, but also men and children, Aesthetic Today has a broad vision of being everything to everyone, a bold dream that captures the energy and passion of its CEO, who describes herself as being ambitious, decisive and driven, but compassionate leader. I've toughened myself up, through many years of managing huge companies and brands in the UAE and the Middle East.

Opportunities for success are everywhere, and those that managed to leverage these opportunities and innovate are those that will do well. Failures are part of the journey, but entrepreneurs must not see them as stumbling blocks, they are in fact steps in the ladder of success. Failures are not the opposite of success; they are necessary experiences before accomplishments and achievements are made.

Has Covid-19 effected Aesthetic Today?

The COVID-19 pandemic has resulted in more people working from home, which may explain the increase in online sales. However, there have been some decreases in sales due to lockdowns and restrictions. We are trying to manage this situation so that we can continue to be successful. This is just a challenge that we need to overcome and continue to work hard for the company and for our employees.

Any new expansion plans in other countries or in the GCC?

We're hoping to implement this soon. The sooner we can do this, the better off we'll be. We've been planning this for a while and it's time to take action. This will help us immensely.

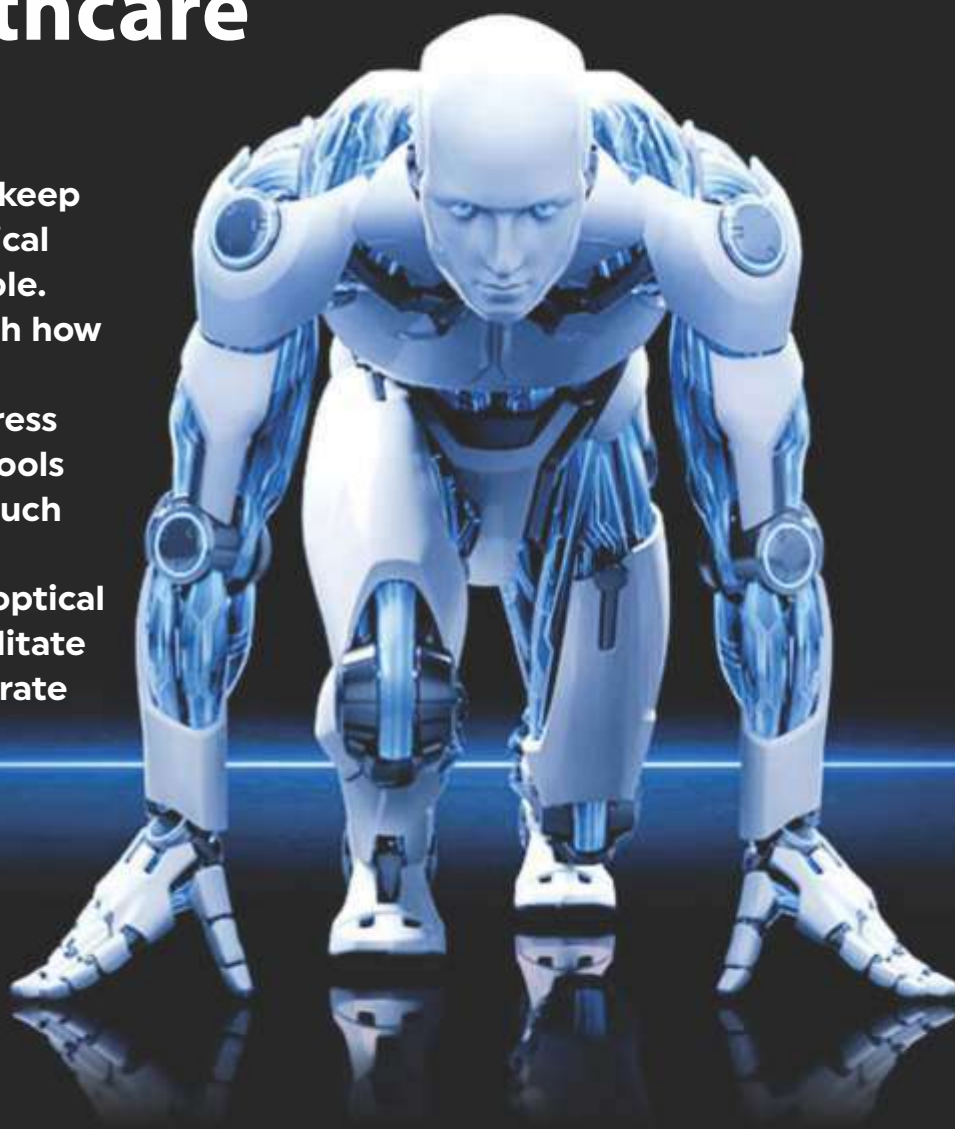
What do you think could be the future of aesthetic today?

I have always believed that if the plan doesn't work, change the plan but never the goal. With this motto in mind, I have visualized Aesthetic as one of the most trusted Aesthetic Beauty Online stores not just in UAE, but in the GCC countries and even abroad. I am determined to work hard with my team to get to that ladder of success.

Soon, Aesthetic Today will unveil its services and treatment section, where customers will have access to some of the world's leading beauty experts for advice and consultation for DIY treatments at home. This is a distinctive service that shows how determined and genuinely committed Aesthetic Today is in being able to fulfil the beauty and wellness needs of its shoppers.

The rise of Machine Learning in the healthcare industry

Embracing technology to keep health records made medical information more accessible. Still, there's a problem with how to collect data effectively. Machine learning can address this problem by offering tools for fast data processing. Such technologies as natural language processing and optical character recognition facilitate data collection and accelerate administrative workflow



In the early 90s, when personal computers and the Internet became more accessible, hospitals actively began to implement electronic medical record software. According to the Centers for Disease Control and Prevention, 85% of office-based physicians use an EMR/EHR system.

Technology is changing the healthcare industry for the better. EHRs, telehealth, and other information technologies are making it easier to get medical treatment. Machine learning is a subset of artificial intelligence that is developing rapidly nowadays.

Machine Learning already simplifies disease diagnosis and helps physicians draw up treatment plans more precisely. Its algorithms process vast amounts of patients' data to make reasonable conclusions faster and more accurately than the human brain.

Although machine learning technologies are far from completely replacing humans, they greatly simplify physicians' work and help make smart decisions. Here's a closer look at how machine learning is improving the healthcare industry.

Embracing technology to keep health records made medical information more accessible. Still, there's a problem with how to collect data effectively. Machine learning can address this problem by offering tools for fast data processing. Such technologies as natural language processing and optical character recognition facilitate data collection and accelerate administrative workflow.

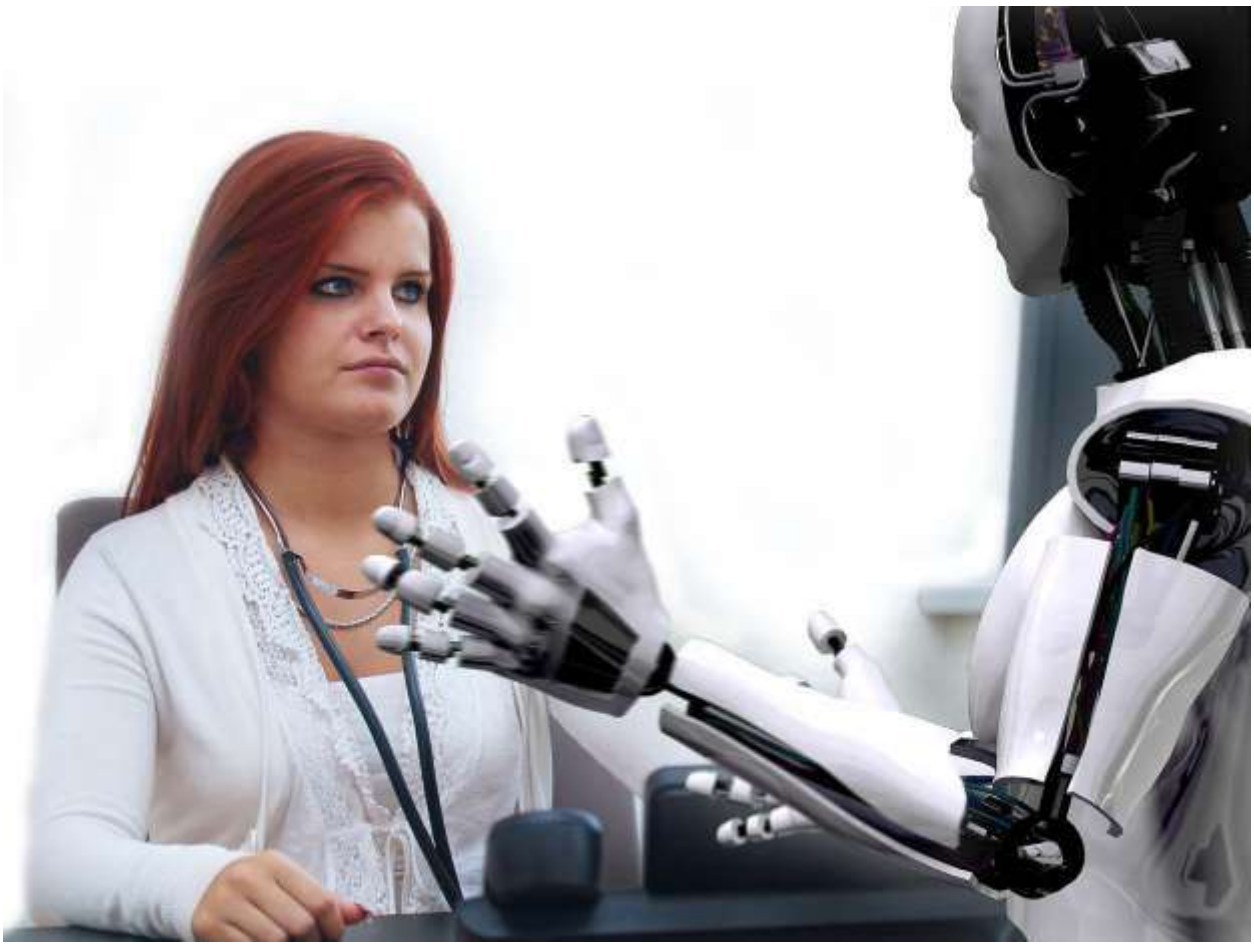
The global artificial intelligence in healthcare market size was valued at $15.4 billion in 2022 is expected to expand at a compound annual growth rate (CAGR) of 37.5% from 2023 to 2030. The growing datasets of patient health-related digital information, increasing demand for personalized medicine, and the rising demand for reducing care expenses are some of the major driving forces of the market growth. The growing global geriatric population, changing lifestyles, rising prevalence of chronic diseases has contributed to the surge in demand for diagnosing and improved understanding of diseases in their initial stages. Artificial Intelligence (AI) and machine learning (ML) algorithms are being widely adopted and integrated into healthcare systems to accurately predict diseases in their early stage based on historical health datasets (Grand view research).

Increased treatment protocol

Treatment planning often requires a lot of time and knowledge of medical specialists. Developing a treatment plan is highly complex when we talk about cancer therapy. Depending on each patient's body type and tumor peculiarities, therapists should develop balanced treatment procedures to deliver precise portions of radiation to the tumor and minimize irradiation to healthy organs.

Machine learning algorithms can analyze patients' medical information and create personalized treatment plans based on previous successful treatment plans databases. The study reveals that machine learning-based treatment plans were preferred to human-made ones and were used in 88% of prostate cancer radiation therapy cases.

The global artificial intelligence in healthcare market size was valued at $15.4 billion in 2022 is expected to expand at a compound annual growth rate (CAGR) of 37.5% from 2023 to 2030. The growing datasets of patient health-related digital information, increasing demand for personalized medicine, and the rising demand for reducing care expenses are some of the major driving forces of the market growth. The growing global geriatric population, changing lifestyles, rising prevalence of chronic diseases has contributed to the surge in demand for diagnosing and improved understanding of diseases in their initial stages. Artificial Intelligence (AI) and machine learning (ML) algorithms are being widely adopted and integrated into healthcare systems to accurately predict diseases in their early stage based on historical health datasets (Grand view research).



Drug development

The traditional drug development process is complex. It requires a lot of time and financing to put the drug to market. It could take more than ten years and over $2 billion to develop a new medicine.

Machine learning can assist chemists and pharmacists in boosting the drug discovery pathway. ML algorithms apply to each stage of drug discovery, from target validation to digital data processing in clinical trials. The main goal of ML in the pharmaceutical industry is to improve processes and outcomes. For example, Pfizer's pharmaceutical company used AI technologies to accelerate clinical trials when developing the Covid-19 vaccine. The algorithms managed to clean up patients' data in less than 24 hours when it usually takes up to 30 days with manual datasets analysis. The ML tool also provided quality data throughout the trial with little human intervention.

Real time analytics

Analytics in healthcare focuses on improving care experience. Patient data measurement and analytics facilitate decision-making by providing evidence to support medical insights. There are few stages of analytics capabilities. Descriptive and diagnostic analytics are traditional methods that work with past data to create statistical reports such as a percentage of patients sick with flu compared to last and previous months.

The next analytics stages are predictive, prescriptive and cognitive analytics. These methods require advanced computational algorithms to perform forecasting, real-time suggestions, and automated decision-making. Machine learning techniques provide the healthcare industry with insightful information & help to make intelligent decisions. Analytic outcomes, when decoded right, can enhance the treatment process, speed up recovery, foreseen relapses, save costs, & more.

AI-based analytics is developing rapidly. Such companies as ConcertAI use real-world data and machine learning models to optimize patient care and promote recovery. ConcertAI provides on-demand access to real-world data repositories and AI-driven oncology solutions to improve cancer treatment. Recently, the company started a collaboration with FDAto bring real-world evidence to regulatory decisions.

Enhanced data Security

Technology integration in the healthcare industry has led to a growth of sensitive data. Patients' records, personal information, diagnostic reports, test results are excellent targets for manipulation by cybercriminals. Dealing with data breaches' consequences is costly and time-consuming. According to the Bitglass healthcare breach report, the average cost per breached record in 2020 was $499. Considering 26.4 million records were hacked, healthcare organizations spent $13.2

Personalized medicine is based on diagnostic tests to determine the best medical treatment for each individual. Physicians consider a patient's clinical history, circumstances, and risk factors to develop a unique treatment plan or prevent disease relapse.

billion on data breaches. That's why protecting patients' data is crucial for the healthcare industry.

Machine learning algorithms can improve fraud detection and prevent cyberattacks using predictive analytics. Security Information and Event Management (SIEM) software analyzes real-time security alerts from a healthcare organization network to provide security reports for compliance purposes. Powered with machine learning models, SIEMs could improve attack detection. The software tracks users' activities to understand the typical usage patterns and then distinguishes suspicious activities within the system. If the system discerns the user behavior as unusual, it can flag the action as a fraud or shut the user out from the network.

Personalized patient care

Personalized medicine is based on diagnostic tests to determine the best medical treatment for each individual. Physicians consider a patient's clinical history, circumstances, and risk factors to develop a unique treatment plan or prevent disease relapse.

Personalized medicine is gaining momentum due to improved knowledge about diseases and new analytics approaches powered by AI technologies.

What does the future hold?

Machine learning has the potential to transform the ways physicians deliver medical care. Automation and predictive analytics will enable caregivers to refocus their efforts on improving patient care rather than dealing with mundane tasks. AI-based technologies could take over different practitioners' duties, from administrative functions to fast and precise diagnosis to remote real-time treatment. This shifting paradigm will transform the approaches to medical education. Future practitioners will require advanced skills of working with data and innovations, continuous learning, and operating with knowledge from different disciplines.

The AI development in healthcare is moving towards hybrid models that can support clinicians in diagnosing diseases, drawing up treatment plans, monitoring patients, and analyzing risk factors while leaving humans the opportunity to make responsible decisions. According to the Intel survey, only 37% of healthcare decision-makers already use AI tools. Many operational processes in medicine still need to be improved, and artificial intelligence technologies, including machine learning, can contribute to the healthcare industry. Therefore, the development of AI-powered healthcare applications is in high demand nowadays. We are moving towards a high-tech society in which medicine is acquiring new tools for interacting with patient data to treat people more effectively.

Innovation driving the growth in the French medical technology sector

"France, a land of excellence in terms of engineering, research, medicine and entrepreneurship, has all the strengths in hand to become a world leader in MedTech," says Guirec Le Lous, President of the MedTech in France association

France is a country primarily located in Western Europe. It also comprises of overseas regions and territories in the Americas and the Atlantic, Pacific and Indian Oceans. Its metropolitan area extends from the Rhine to the Atlantic Ocean and from the Mediterranean Sea to the English Channel and the North Sea; overseas territories include French Guiana in South America, Saint Pierre and Miquelon in the North Atlantic, the French West Indies, and many islands in Oceania and the Indian Ocean. Due to its several coastal territories, France has the largest exclusive economic zone in the world. France borders Belgium, Luxembourg, Germany, Switzerland, Monaco, Italy, Andorra, and Spain in continental Europe, as well as the Netherlands, Suriname, and Brazil in the Americas via its overseas territories in French Guiana and Saint Martin. Its eighteen integral regions (five of which are overseas) span a combined area of 643,801 km2 (248,573 sq mi) and contain close to 68 million people (as of July 2022).

Image: Mont Saint Michel, Normandy

France is a unitary semi-presidential republic with its capital in Paris, the country's largest city and main cultural and commercial center; other major urban areas include Marseille, Lyon, Toulouse, Lille, Bordeaux and Nice.

French healthcare sector

France has a high quality healthcare system that offers universal coverage for all citizens, regardless of age or economic situation. It consists of an integrated network of public and private services including doctors, hospitals, and specialist providers.

Residents are covered through mandatory health insurance contributions in France, with optional private insurance available for those who want additional coverage. Government-funded agencies cover more than 75% of health expenditures in France.

The Ministry of Social Affairs and Health (Ministere des Solidarites et de la Sante) administrates public healthcare in France, with primary and secondary care services delivered by the various different healthcare providers. France offers a high level of preventative healthcare, with available services including addiction prevention, regular medical check-ups, and the promotion of physical activity and healthy eating.

France is ranked 11th on the 2018 Euro Health Consumer Index and has been praised for its efficiency and outcomes. For example, the country has the lowest heart disease mortality in Europe, although it has been criticized for its over-reliance on prescription medication.

Public healthcare in France is accessible by all residents through French health insurance contributions. As of 2016, a new healthcare system for foreigners, known as Protection Universelle Maladie (PUMA), allows access to state healthcare after three months of residence.

By law, all residents must have some for of health insurance, whether state or private. If your household income falls below a certain threshold, you may be eligible for free commentary health insurance coverage (CMU-C) or help in taking out supplementary private health insurance (Aide pour une Complémentaire Santé or ACS).

If your application for legal residence has not been finalized, you may be eligible for State Medical Assistance (Aide Médicale d'Etat or AME). For more detailed information, visit the CMU.

Temporary visitors to France from the EU/EEA/Switzerland can access public healthcare if they have a European Health Insurance Card (EHIC). Retirees from the EU/EEA/Switzerland relocating to France can access healthcare services by completing a social security S1 form in their home country.

Medical technology sector

With 1,502 companies, generating annual turnover of €30 billion, France is Europe's second-largest medical technologies market, behind Germany. It ranks third amongst European countries in terms of employment, with 89,130 people employed. French companies, 93% of which are SMEs, operate in a wide range of fields, from e-health to surgical robotics, telemedicine, optical technologies, scar management, medical imaging and many more.

"France, a land of excellence in terms of engineering, research, medicine and entrepreneurship, has all the strengths in hand to become a world leader in MedTech," says Guirec Le Lous, President of the MedTech in France association, which was created in 2013 and whose ambition is to enable the emergence of French champions in medical technologies.

The sector's growth is supported by the strong internationalization of its players: the French companies in the sector generate a turnover of €9 billion from export, growing by almost 10% between 2017 and 2019. By way of comparison, the industry's growth rate is 4% over the same period.

The sector is characterized by products with a short life cycle and continuous innovation. The proportion of turnover devoted to R&D reached 6% in 2019 and almost 13% of companies operate exclusively in R&D.

On the strength of this dynamism, France ranks fifth worldwide in number of European and international patents filed in the medical devices sector, with 3,750 patents per year. Companies in the sector have the benefit of a public R&D ecosystem that enjoys international renown: France has a culture and public funding system that is favourable to R&D, with, in particular, solid upstream innovation support tools, such as the Innovation Tax Credit (CII) and the Research Tax Credit (CIR), combined with excellent clinical and academic research.

This support was stepped up even further in the wake of the Covid-19 health crisis, as the Government took action to strengthen France's independence in access to medicines and medical devices. To wit, the State dedicated nearly €200 million to the development of the healthcare industry to encourage research and production in the sector.

French Biotech sector

For many people France is synonymous with wines, cheese and rich meals. But the country also has a strong biotech community that how grown significantly over the past decade, with a strong focus on developing clinical drug assets.

France has several well-known pharma companies that are cornerstones for the industry, including Sanofi, Ipsen, Servier, Pierre Fabre and LFB Biotechnologies.

Earlier this month, France Biotech, which represents life science entrepreneurs, released its 16th "French Health Tech Survey," that showed the transformation of the French biotech environment over the past decade has grown to include more than 1,800 companies with a broad focus on multiple aspects of the healthcare space. According to the survey, France's life science industry includes 720 biotech companies, 73 biocleantech companies, 886 companies specialized in medical devices and diagnostics and 200 companies focusing on eHealth. The latest survey shows that more than half of these companies, 53 percent, employ one to 10 employees. Also, many of these companies have sprung into existence over the past several years. According to the survey, 41 percent of the companies are less than five years old.

The France Biotech survey included 365 French companies that employ about 9,438 people. Maryvonne Hiance, president of France Biotech, said the French biotech industry is able to draw from a range of new technologies that help it grow. One area that Hiance and France Biotech see growth is through the use of artificial intelligence and big data. About one-third of the surveyed companies already use these technologies and the other two-thirds of companies that participated in the survey said they intend to start using them in the future. Hiance said this is a key area for improvement in the sector.

One of the key strengths of the French biotech industry that the survey revealed is the amount of research and development being conducted, particularly as it compared to the sector 10 years ago. The survey showed that in 2018, there are 386 drug candidates in clinical development by the companies that participated, compared to only 178 in 2008. For these companies, R&D investments on average were €9 million, about $10.2 million. Of the companies that participated in the survey, at least 15 percent of their total expenses are made in R&D.

Hiance said that the R&D work being conducted the biotech companies sampled in the survey is actually a greater amount than the companies she called "the main French pharmaceutical companies." The abundance of projects developed by innovative health startups is a key growth driver for big pharma and biopharma companies looking to innovate and renew their product portfolios, she said.

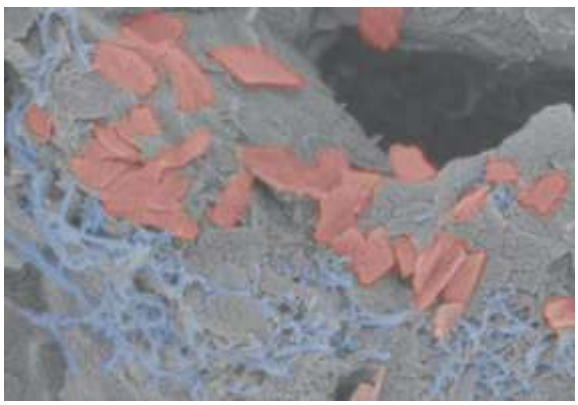
In addition to a focus on R&D, the survey also noted that for these companies, there is a focus on international growth. The survey showed that 64 percent of the companies that opened subsidiaries over the past decade, did so abroad, with the United States begin the preferred location. Since 2013, these types of international partnerships are on the rise, increasing from 25 percent in 2013 to 33 percent this year.

The international arena is also playing a key role when it comes to investments. The survey showed an uptick in the amount of global investments made in the French biotech sector. France Biotech said the trend of foreign investment can be explained by the "sustained interest of foreign investors in medical technologies, at a time when digital technology and patient data management are revolutionizing the industry."

While the R&D and the increase in foreign dollars is a bright spot, the France Biotech survey did show a few difficulties affecting the industry in that country. France Biotech noted that a majority of the companies that participated in the survey are struggling to find the funding they desire. Also, the survey showed that about half of those companies reported having difficulties in raising money. From the survey, 75 percent of the firms sampled believe that industrial partnerships are the way forward to draw funding.

"Let us ensure that all of the players in our ecosystem, including startup companies, public agencies, researchers and healthcare institutions, work together to build the medicine of the future, entirely dedicated to patients," Hiance said.

Soft hydrogel scaffold that functions as a living electrode for brain-computer interface applications



A team of researchers at the Harvard Wyss Institute have developed a soft, hydrogel scaffold that can function as a living electrode for brain-computer interface applications. The researchers used electrically conductive materials and created a porous and flexible scaffold using a freeze-drying process. They then seeded the scaffold with human neural progenitor cells (NPCs) and cultured the scaffolds for extended periods, prompting the cells to differentiate into a variety of neurons and astrocytes. The researchers hope that the resulting 'living electrode' could be useful for brain-computer interfaces, as its soft and flexible nature will help it to conform with soft neural tissues and its cellular cargo will help to enhance its biocompatibility and potential efficacy.

The scaffold consists of a soft hydrogel (gray) that contains carbon nanotubes (blue) and graphene flakes (red) as conductive materials to transmit electrical impulses throughout the scaffold. Credit: Wyss Institute at Harvard University

Brain-computer interfaces hold enormous promise in unlocking therapeutic outcomes that would have seemed like science fiction just a few short years ago. From controlling wheelchairs with the mind to restoring sight to the blind, the opportunities in enhancing patient well-being are huge. However, the technology still has a way to go and on a first look, machines and the human body are not a match made in heaven. The interfacing electrodes in such systems are typically made using metal and are rigid, both of which do not assist the technology in non-invasively interacting with delicate neural tissues.

These researchers set out to create an electrode that is not just flexible, but also covered in living neural cells, and is based on the concept that living tissue is likely to be the most biocompatible material to interface with other living tissue. The researchers also conceived the cell-laden material as delivering electrical impulses more naturally through cell-cell contact.

"This conductive, hydrogel-based scaffold has great potential," said Christina Tringides, a researcher involved in the study. "Not only can it be used to study the formation of human neural networks in vitro, it could also enable the creation of implantable biohybrid BCIs that more seamlessly integrate with a patient's brain tissue, improving their performance and decreasing risk of injury."

To create their scaffolds, the researchers used an alginate hydrogel and added some carbon nano-materials for electrical conductivity before a final freeze-drying step. The freeze drying process creates ice-crystals in the material that then sublime during freeze-drying, leaving many pores into which cells can enter and live. They seeded the scaffolds with neural progenitor cells, which then differentiated into more mature neural cells during an extended culture period.

"The successful differentiation of human NPCs into multiple types of brain cells within our scaffolds is confirmation that the conductive hydrogel provides them the right kind of environment in which to grow in vitro," said Dave Mooney, another researcher involved in the study. "It was especially exciting to see myelination on the neurons' axons, as that has been an ongoing challenge to replicate in living models of the brain."

Researchers at the National Eye Institute, which is part of the National Institutes of Health, have created a method to 3D bioprint eye tissue that forms the outer blood-retina barrier. This tissue supports the photoreceptors in the retina and is implicated in the initiation of age-related macular degeneration.

US Researchers develop biobots for muscle movements

Researchers at the University of Illinois at Urbana-Champaign have developed centimeter-scale biobots that combine soft materials, mouse muscle tissue, and wireless electronic components. The tiny devices can be controlled remotely through optogenetics. The muscle within the devices forms an optogenetic actuator and creates movement when exposed to light. The researchers can control this movement remotely by activating on-board micro-LEDs wirelessly, which then stimulate the muscle actuators to propel the biobot. The technology could be used in the future to perform tasks within the body, such as surgical applications or drug delivery.

Optogenetics, a technique in which light stimulation can produce specific effects in genetically modified cells, could be very useful for biomedical applications, including both clinical and research activities. However, the technique requires light to reach the modified cells or tissues before the desired effect can be produced, which can be a problem inside our bodies. Possible solutions include fiber optic cables that are advanced into the body from the outside, but this is cumbersome and prone to infections.

These researchers have taken optogenetics to the next level by using it as the basis for movement in a centimeter-scale biobot. The tiny devices incorporate soft materials with mouse muscle tissue that is light sensitive and can produce movement when stimulated with the correct type of light. However, employing the biobot inside the body required a new approach that would allow the device to illuminate itself in response to a wireless command, and thereby produce movement.

The solution included integrating microelectronic components into the device that would allow it to illuminate several on-board micro-LEDs. These components include a receiver coil that allows the biobots to harvest their own power, meaning that they are battery-free. Each micro-LED illuminates a different portion of the muscle tissue within the biobot, allowing for accurate movements such as turning in a specific direction.

"Integrating microelectronics allows the merger of the biological world and the electronics world, both with many advantages of their own, to now produce these electronic biobots and machines that could be useful for many medical, sensing and environmental applications in the future," said Rashid Bashir, a researcher involved in the study.

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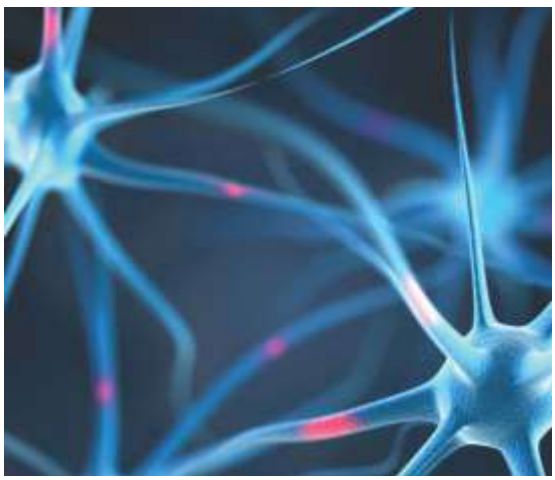
Artificial neurons developed to communicate with the natural neurons in the body



Researchers at Linköping University in Sweden have developed artificial neurons that demonstrate 15 of the 20 characteristics of biological neural cells and can communicate with natural neurons in the body. The researchers call their device the "conductance-based organic electrochemical neuron," or c-OECN, and it is based on materials that can conduct a negative charge, including organic electrochemical transistors and n-type conducting polymers. By printing thousands of such transistors on a flexible substrate, the researchers have been able to create artificial neurons. The device uses ions to control the flow of electricity, just like biological neurons, and so far, the Swedish team has demonstrated that it can control the vagus nerve in mice, suggesting that it has great potential in medical applications.

As medical technologies advance, researchers are becoming more adept at mimicking biological functions using human-made components. This latest artificial neuron is a case in point, as it makes use of ions to control the electricity flowing through it, just as biological neurons do by opening and closing ion channels. The researchers hope that these newly crafted artificial neurons may assist with more realistic neural control in a variety of medical technologies.

"One of the key challenges in creating artificial neurons that effectively mimic real biological neurons is the ability to incorporate ion modulation," said Simone Fabiano, a researcher involved in the study. "Traditional artificial neurons made of silicon can emulate many neural features but cannot communicate through ions. In contrast, c-OECNs use ions to demonstrate several key features of real biological neurons."

The artificial neurons use ions to control the electricity that flows through the conducting polymer within them, which results in voltage spikes that mimic what occurs in real neurons. The technology allows the device to increase and decrease current in a controlled manner as a near perfect bell curve, which is reminiscent of the electrical activity in neurons that is controlled by sodium ion channels.

So far, the researchers have tested the technology in mice, and implanted the printed neurons with the aim of controlling the vagus nerve. The neurons successfully communicated with the vagus nerve, resulting in a 4.5% decrease in heart rate in the mice.

"There is much we still don't fully understand about the human brain and nerve cells," said Padinhare Cholakkal Harikesh, another researcher involved in the study. "In fact, we don't know how the nerve cell makes use of many of these 15 demonstrated features. Mimicking the nerve cells can enable us to understand the brain better and build circuits capable of performing intelligent tasks. We've got a long road ahead, but this study is a good start."

More advanced in vitro tissue models developed to study Retinal Diseases

Researchers are making strides in developing more advanced in vitro tissue models to study disease. Many diseases lack relevant and useful in vitro models and in many cases experimental animals may not accurately mimic human physiology, as well as entailing ethical concerns. Therefore, there is a need to develop more advanced in vitro systems that allow us to accurately mimic human tissues and study disease.

"We know that age-related macular degeneration starts in the outer blood-retina barrier," said Kapil Bharti, a researcher involved in the study. "However, mechanisms of age-related macular degeneration initiation and progression to advanced dry and wet stages remain poorly understood due to the lack of physiologically relevant human models."

To address this, these researchers developed a 3D bioprinted model of the outer blood-retina barrier. In age-related macular degeneration, the retinal pigment epithelium (RPE) of this tissue breaks down, leading to photoreceptor degeneration and eventual vision impairment.

To create the printed constructs, the researchers combined three cell types, which had been derived from patient stem cells. These were pericytes, endothelial cells, and fibroblasts. They mixed the cells with a temperature sensitive hydrogel and then bioprinted the mixture onto a biodegradable scaffold.

The researchers cultured the tissue constructs and observed that they reached maturity about six weeks later, demonstrating features of the native outer blood-retina barrier. They were then able to model age-related macular degeneration by exposing the tissue to low oxygen and they tested the effects of drugs that are used to treat the condition in humans.

"By printing cells, we're facilitating the exchange of cellular cues that are necessary for normal outer blood-retina barrier anatomy," said Bharti. "For example, presence of RPE cells induces gene expression changes in fibroblasts that contribute to the formation of Bruch's membrane — something that was suggested many years ago but wasn't proven until our model."

Dr. Dror Paley opens first clinic in the Middle East

As part of its ongoing efforts to focus on complex care and pediatric sub-specialties, Burjeel Holdings, one of the leading private healthcare services providers in the MENA region, in collaboration with renowned orthopedic surgeon Dr. Dror Paley, has launched a clinic in the UAE. The Paley Middle East Clinic, located at Burjeel Medical City (BMC) in Abu Dhabi, aims to become a hub for complex procedures in the region by providing world-class specialized orthopedic care. It is the first clinic in the Middle East and Asia by Dr. Paley, who has performed around 20,000 limb-lengthening and reconstruction-related procedures.

Dr. Paley is internationally recognized for his expertise in limb lengthening, deformity reconstruction, and joint preservation of children and adults. The clinic at BMC offers diagnosis and treatment of special orthopedic conditions, including congenital limb deformities, post-traumatic limb conditions, bone healing problems, bone defects, skeletal dysplasia, metabolic disorders, foot deformities, and peripheral nerve disorders.

BMC, one of the leading quaternary care facilities in the UAE, expects the clinic, supported by a comprehensive rehabilitation department, to serve as a beacon for orthopedic surgical excellence and innovation.

"I am delighted to start my innings in the UAE with BMC. Together we aim to transform the UAE into a hub for limb lengthening and deformity correction, attracting patients from across the globe for cutting-edge treatments," said Dr. Paley.

Welcoming Dr. Paley, Mr. John Sunil, CEO, Burjeel Holdings, said: "The collaboration is yet another important step in the Group's pursuit of delivering healthcare excellence and improving patient outcomes. We are constantly investing in and establishing new partnerships to identify cutting-edge medical technologies and innovations that can help us deliver complex care to the people. Dr. Paley's expertise will help the people avail of almost every aspect of orthopedic and neurosurgical care, making the UAE a sought-after hub for such services."

EHS unveils transformative project that deploys Metaverse technology in healthcare delivery

The Emirates Health Services (EHS) has launched a Metaverse based Virtual Telemedicine Solution using 3D virtual reality technology. The launch is part of transformative projects which leverage advanced technology and promote smart services such as remote health solutions and telemedicine.

Through the project, EHS aims to deliver virtual medical consultation services supported by advanced technologies. This first-of-its-kind technology enables members of society to access e-services via smart devices, thus scaling up service to reach broader segments of individuals and enhance the customer experience. Patients can effortlessly access psychiatric consultation services, family health promotion clinics, and customer happiness centers through the new virtual channel.

H.E. Dr. Yousif Mohammed Al-Serkal, Director-General of Emirates Health Services, said it is the first global healthcare provider to apply Metaverse technology to provide advanced services and promote sustainable health development goals by adopting best practices that leverage AI, IoT and Blockchain technologies. "This aims to strengthen governance, clinical review services, and research, promote global ethical standards and best practices, and enhance the sector's competitiveness to world-class levels. The above aligns with our strategy of future-proofing our services against emerging challenges."

He added: "Our transformative projects aimed at promoting innovation, investing in national healthcare capacities, and continuing to keep abreast of the rapid global developments and changes in the sector by using the latest global medical devices and AI-based treatments and service automation. The transformative projects underline our forward-looking vision to integrate the tools and techniques of the Fourth Industrial Revolution in delivering advanced preventive, diagnostic and therapeutic services. The projects align with the UAE Centennial Plan 2071 to bring about a qualitative leap in our healthcare sector."

The new initiative aims to promote telemedicine practices in virtual clinics and provide consultation services and medications through robotic pharmacies. It also focuses on increasing customer satisfaction and boosting patients' confidence by delivering excellent outpatient services and updating service channels.

The project will provide psychiatric consultation services for different age groups in addition to accessing the Customer Happiness Centre and family-centered health promotion services. The project complements the goal of EHS to be at the forefront in applying Metaverse technology and equipment-free services.

Metaverse provides a 3D interactive space that allows customers to engage with healthcare professionals through a secure link using their devices equipped with a camera, microphone, and speakers. This way, patients need not purchase equipment such as headphones or controllers. Doctors can assess conditions, discuss treatment plans, and provide treatment and other clinical services.

The Metaverse comprises multiple emerging technologies and creates a roadmap for providing specific virtual rehabilitation services covering physiotherapy, autism, support groups, and ADHD. It also allows physicians to monitor the patient's progress and collect data which can be evaluated using pre-trained A.I. models to upgrade treatment plans and achieve better clinical outcomes.

Intricon launches new Biosensors Centre of Excellence (CoE)

Intricon, developer and manufacturer of medical devices powered by smart miniaturised electronics, has launched a new Biosensors Centre of Excellence (CoE).

The new CoE combines Intricon's biosensor device expertise and capabilities into a vertically integrated business unit focused exclusively on bringing Biosensor devices to the medical market.

Scott Longval, Intricon CEO, said: "OEMs and start-ups need an approach like this because there are important intricacies in creating medical biosensor devices vs. consumer biosensor products.

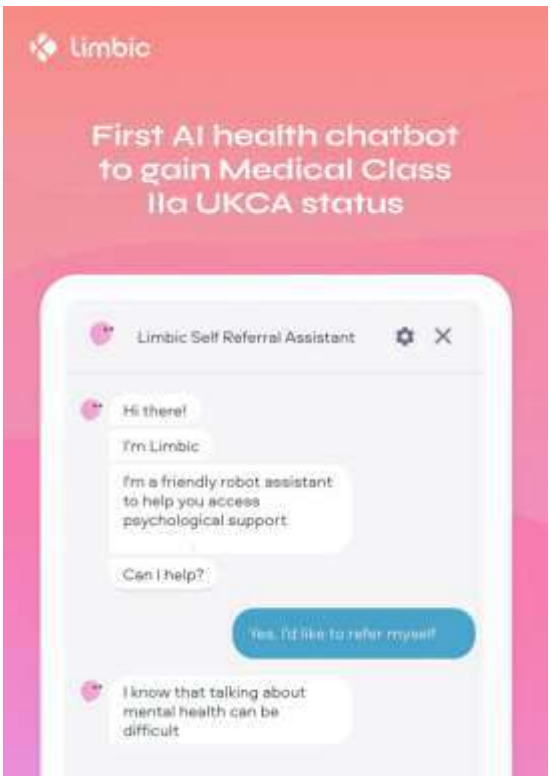
"There's a mass movement toward biosensors for medical applications, such as hospital at home and remote patient monitoring. Creating and commercialising first- and next-generation medical biosensor devices are more complex than ever and must happen at scale and cost profile to meet the demands of these exploding use cases."

Longval adds that Intricon's intensified focus on biosensors is a natural evolution for the company, given its more than four decades of experience in wearable medical biosensor devices. Intricon was an early innovator of hearing aids -- the precursor to today's modern body-worn devices -- and is the primary developer and manufacturer of wearable glucose monitoring devices for the world's largest med device company.

Dave Liebl, Intricon, chief commercial and technology officer, said: "We're responding to the industry, which needs deep expertise in the many complex capabilities required to successfully compete in this quickly emerging device category."

The Intricon Biosensor CoE team has expertise in high-density microelectronics, miniaturisation, ultra-low power, miniature moulding, firmware development, and wireless communication, including Bluetooth and Bluetooth Low Energy technology. Intricon plans to expand its team of biosensors experts, with key hires in 2023.

Intricon's other sensor-driven expertise is in developing and manufacturing medical devices that use electromagnetic (EM) navigation. The company has proprietary modelling and engineering systems to design and produce micro-coils that meet electromagnetic goals such as induction, resistance, sensitivity, and localisation performance.



Limbic Access achieves Class IIa UKCA medical device certification

Limbic Access, a psychological assessment AI chatbot tool that can predict mental health disorders with an accuracy rate of 93%, has achieved Class IIa UKCA medical device certification.

The certification confirms that Limbic Access, which uses machine learning to continuously improve the quality of its digital assessments and conversations, can be safely incorporated into the psychological therapy pathway to support patient self-referral.

Limbic Access can classify the eight common mental health disorders treated by NHS Talking Therapies (IAPTs) with an accuracy of 93%, further supporting therapists and augmenting the human-led clinical assessment.

Its certification comes as NHS Improving Access to Psychological Therapies (IAPT) services are experiencing significant capacity challenges in the face of record demand – with latest data showing a 21.5% increase in people accessing NHS talking therapies services over the last year.

Dr Ross Harper, co-founder and CEO of Limbic, the UK-based healthtech company that created this mental health e-triage chatbot said: "This is a landmark moment for mental healthcare, as it provides strong evidence that our psychological assessment software - the first in the world to gain this level of certification - is a safe and clinically effective way to augment the therapy process within mental health services at a time when such support has never been more needed."

130,000 NHS patients have so far accessed psychological therapy using Limbic's AI mental health chatbot. UKCA auditors, SGS, reviewed clinical evidence generated from more than 60,000 referrals and found that, when compared with standard referral methods such as telephone calls and online forms, Limbic Access helps deliver:

- **53% improvement in recovery rates**
- **45% fewer changes in treatment, due to increased triage accuracy**
- **23.5% reduction in assessment time - a saving of 12.7 minutes per referral**
- **18% reduction in treatment dropouts**
- **13% reduction in wait time for assessment**
- **5% shorter wait time for treatment**

Limbic Access is already working with 25% of NHS IAPTs to augment its therapy process and, to date, it is estimated to have saved IAPT services in England more than 30,000 clinical hours. At a time when the NHS is massively overburdened – latest data shows a 16.2% increase in the number of people in contact with NHS mental health services over the last 12 months - this is critical time released for staff.

Dr Harper added: "Limbic Access is reducing the workload for IAPT services by gathering information through a friendly, supportive chatbot conversation and using its machine learning capabilities to deliver effective triage. The result is that clinicians are more informed ahead of appointments and can spend more time focusing on the patient; services have less admin to complete, and patients enjoy shorter wait times and faster recovery. It's win-win-win.

"There is one additional benefit too – one that helps explain why those services that have implemented Limbic Access see an increase in patient referrals. It can be daunting to take the first step to accessing mental health services, and patients often dread having to articulate their most sensitive thoughts and feelings over the phone to another human. The fact that Limbic is unashamedly an AI removes the pressure from that conversation, while the warm, supportive tone of the chatbot means they still get the benefits of the human experience, just without the worry."

Andy Wright, chief operating officer of Insight IAPT, a not-for-profit organisation providing free talking therapies on behalf of the NHS, added: "At Insight IAPT, we embrace innovations that help us to deliver operationally and clinically excellent IAPT services. We have partnered with Limbic since 2021, which has allowed us to launch Limbic Access into all of our services. The majority of our referrals are digital; 90% of these now come via Limbic AI. When we launched Limbic AI on our website, we experienced an immediate 32% increase in access across our services.

"Limbic AI has allowed patients to refer themselves at a time most convenient to them, and to book an appointment directly with a practitioner. This has been so popular and successful that 40% of our self-referrals are now received outside of our normal working hours. The overall impact of this has included assessments and treatment being offered more quickly, waiting times have reduced, and patients are more likely to complete their treatment. We are excited about working with Limbic to co-produce new innovations that will continue to improve our patients' experience."

Through Limbic Access and its sister product, Limbic Care – designed to provide personalised support and remote monitoring for patients in treatment – the tech company has created an end-to-end solution for talk therapy that's designed to augment psychological therapy from start to finish.

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Fluidx launches new device for Neurovascular Use

Fluidx Medical Technology, Inc., released information regarding the success of the IMPASS Embolic Device in in-vivo research related to middle meningeal artery (MMA) embolizations which can be used to treat chronic subdural hematomas (CSDH) on the surface of the brain.

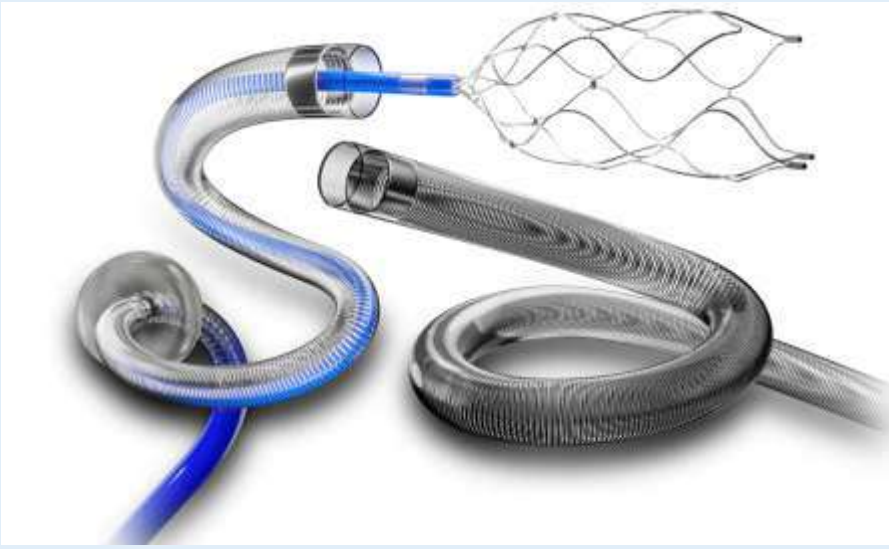
CSDH is a common pathology encountered that can result in death and/or disability in patients. The typical treatment of CSDH involves drilling a hole in the skull and draining the blood. Minimally invasive catheter-based MMA embolization can be an alternative to surgical treatment.

"We've been listening to clinicians and they need better tools to treat CSDH," says Danny Smith, VP of R&D for Fluidx. "We designed the IMPASS Embolization Device to work with standard embolization catheters and embolize small microvasculature in the MMA. Our results are encouraging and the IMPASS product could be a great solution to unmet patient needs."

MMA embolization is a promising option to address CSDH and is particularly appealing for elderly patients and others who cannot undergo invasive surgical procedures. Hundreds of thousands of patients with CSDHs may benefit from this minimally invasive procedure. During this procedure, a small catheter is navigated into the MMA which is located within the dura mater which covers the brain, then an embolic material is delivered into the vessel to block arterial flow.

The IMPASS Embolic Device is part of the portfolio of embolics currently under development by Fluidx. In the fall, Fluidx announced successful completion of a multi-center clinical trial with the GPX Embolic Device to treat a broad range of peripheral applications including tumor devascularization.

Similar to the GPX Embolic Device, the IMPASS Embolic Device uses core Fluidx embolic technology but is designed specifically for neurovascular uses. The material is a low viscosity, aqueous-based solution that solidifies into a durable embolus upon delivery without polymerization or dimethyl-sulfoxide (DMSO) precipitation.



The IMPASS Embolic Device is part of the portfolio of embolics currently under development by Fluidx. In the fall, Fluidx announced successful completion of a multi-center clinical trial with the GPX Embolic Device to treat a broad range of peripheral applications including tumor devascularization.

The Fluidx embolic platform is expected to bring simple preparation and controllable material delivery to a range of applications. The IMPASS device is packaged in a ready-to-use syringe, can be prepped tableside by the clinician in about 30 seconds, and may be delivered through standard microcatheters (no complex mixing systems or special delivery catheters are necessary).

About Fluidx Medical Technology

FLUIDX MEDICAL TECHNOLOGY

Fluidx Medical Technology is a Salt Lake City, Utah based company focused on developing GPX, IMPASS, and other embolic technologies with applications across peripheral vascular, interventional oncology, and neurovascular embolization.

The GPX and IMPASS Embolic Devices are under development, described and shown for research, educational, and engineering use only, and do not have marketing clearance or approval in any market at this time.

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16th World Congress of Pain Clinicians (WSPC)

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Medlab Middle East

06-09 February
Dubai

UAE International Dental Conference & Arab Dental Exhibition (AEEDC Dubai)

07-09 February
Dubai

International Conference on Advances in Health and Medical Science (ICAHMS)

13 February
Dubai

Fellowship in Aesthetic Medicine

16-19 February
Dubai

GTR Mena Dubai

21-22 February
Dubai

Pan Arab Interventional Radiology Society Annual Congress (PAIRS)

22-25 February
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Dubai Stem Cell Congress

27-28 February
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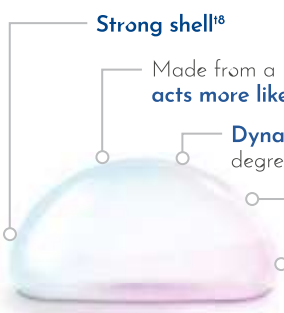

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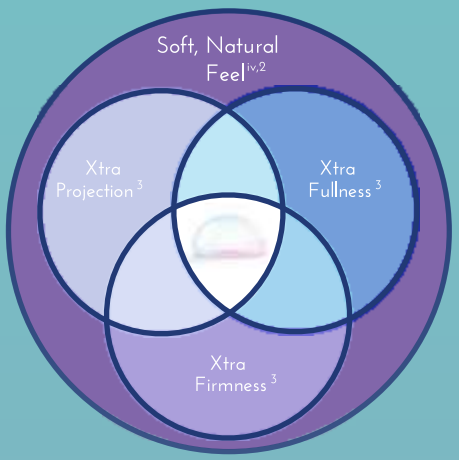
[1] Head-to-head testing according to industry standard ASTM D412 test method for rubber properties in tension (v. 9901) between MemoryGel® (n=10) and Natrelle Inspira (n=10)

Why MemoryGel™ Xtra Breast Implants?[1]



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iv. Mentor Consumer Preference Market Research Report July 2017.

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