

# Analyse & Anticipate **Personalized Medicine**

## A New Mantra For Healthcare



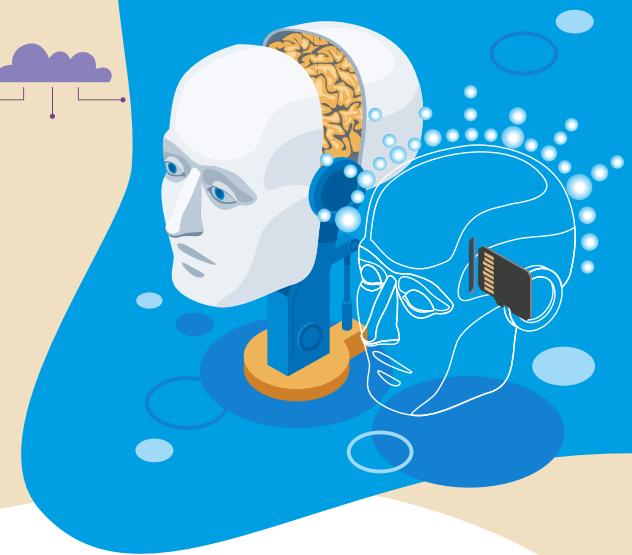
A Report by

**redifusionhealthcare**



# WHAT DOES THE FUTURE HOLD?

## MORE THAN JUST ONE SIZE FITS ALL



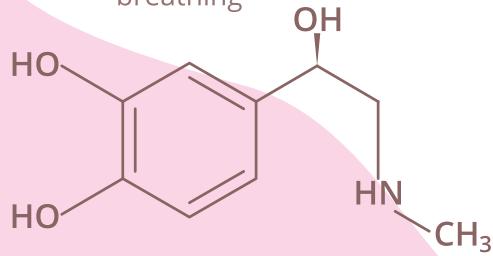
Humanity's search for happiness has always been marred by disease and death. Sickness seems to strike without warning, and recovery is often difficult or impossible. Slowly over the years, with the development of medical science and the relatively recent applications of cutting-edge technology, progress has been made. That progress is now on the cusp of a breakthrough, which will truly revolutionize the nature of healthcare. Artificial Intelligence and genetic sequencing have now opened up a new world – the world of Personalized Medicine.

With Artificial Intelligence analysing huge amounts of data and genetic sequencing identifying specific genetic markers of disease, we can now pre-empt disease instead of just reacting to it. It is now potentially possible to predict future disease in a healthy individual and take proactive steps to prevent it from happening at all. Heart disease, diabetes and cancer could be anticipated well in advance and steps could be taken to avoid them. Vital health signs could be constantly monitored so that patients could be prescribed tailored and accurate doses for effective and side-effect free recovery. The wonders of Personalized Medicine are essentially threefold: Analyse, Anticipate and Personalize.

There are certain key areas where Personalized Medicine will be of crucial benefit to us. This is where specific technology like Artificial Intelligence, advances in diagnostics and wearables come together with medical science to provide key applications. Each of these areas represent new and breakthrough techniques for healthcare under the new system of Personalized Medicine.



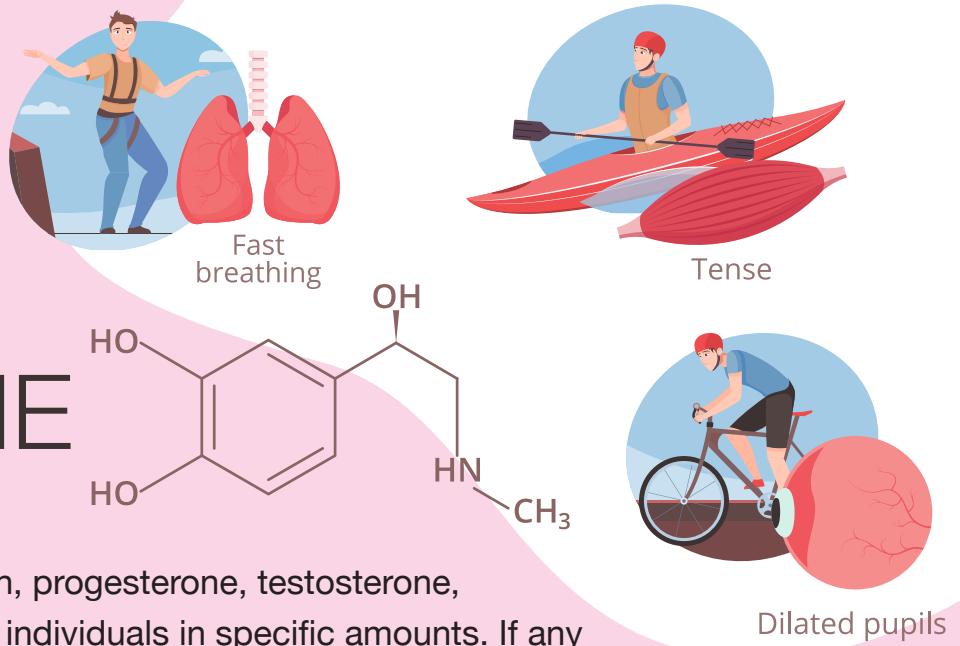
# HORMONE THERAPY



Hormones such as oestrogen, progesterone, testosterone, and thyroid are present in all individuals in specific amounts. If any individual falls outside of the normal range for any of these and other hormones, their treatment must be tailored according to the patient's blood results and their symptoms. Treatments often vary depending on various factors and patients find it difficult to get the exact treatment which is best for them. This is where Personalized Medicine has an ability to excel since it can quickly and effectively devise special treatment methods for hormonal imbalance patients.

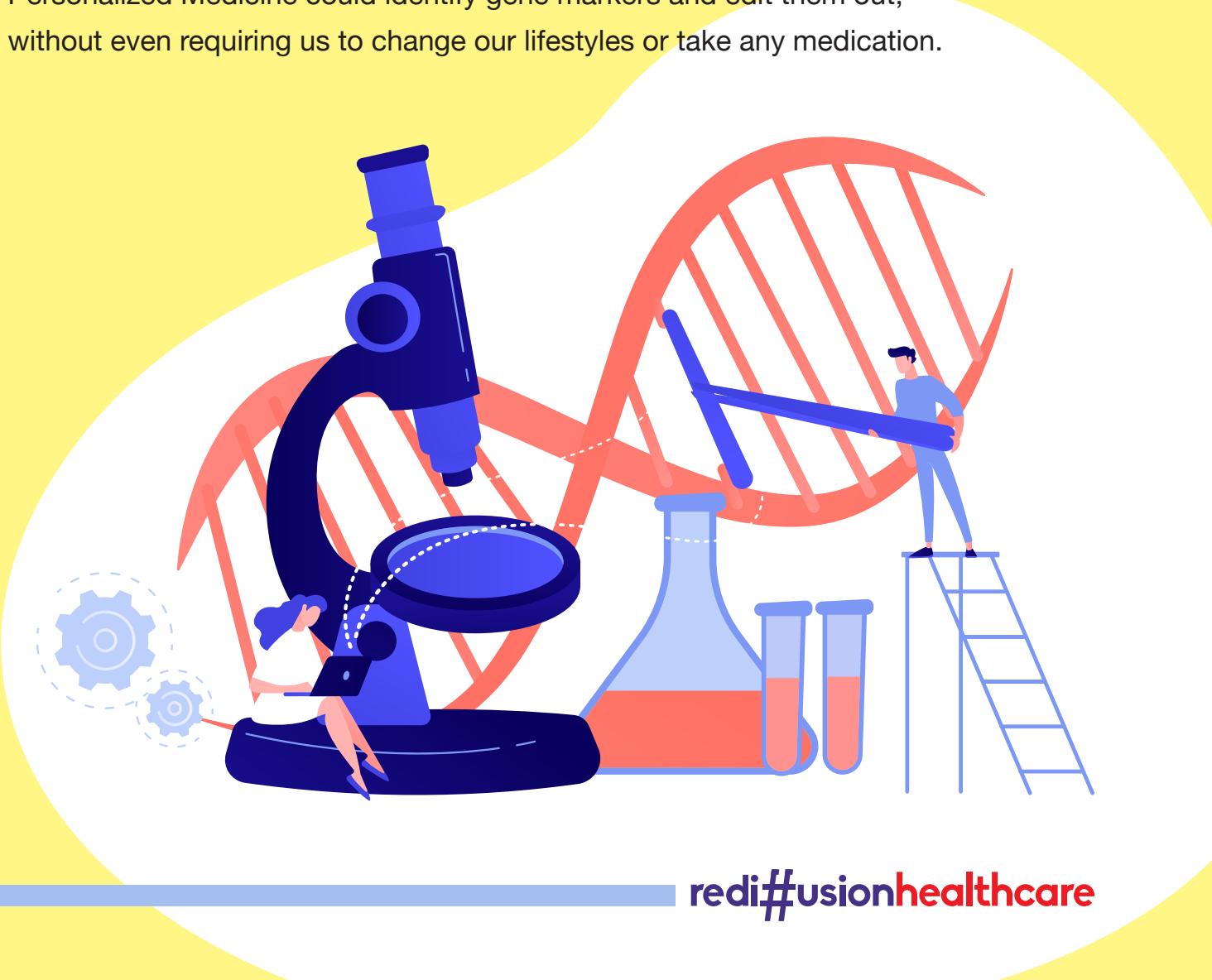
# DRUG REACTIONS

An individual's specific genetic profile can affect the action of some medicines. Some people will not respond to some painkillers while others will develop unpleasant side-effects from them. Some individuals are also at risk of becoming dependent on certain medications. Certain diabetic patients develop chronic side-effects from lifetime medications. All of this could be avoided by developing individual prescriptions for people by analysing their DNA and detailed bio profile through Personalized Medicine.



# GENE EDITING

Once the human genome was completely decoded, it became possible to identify specific genes with specific potential diseases. While it is easy now to identify genes responsible for rare diseases like muscular dystrophy or Parkinson's Disease, it is becoming more possible to identify certain cancer markers or even things like heart disease. In addition to warning us in advance of this potential threat, using a gene-editing tool called CRISPR, we can now repair or remove genetic material within our cells. It is still early in development, but the future possibilities could mean that we could permanently be rid of some extremely malignant diseases without having to suffer from them. Personalized Medicine could identify gene markers and edit them out, without even requiring us to change our lifestyles or take any medication.



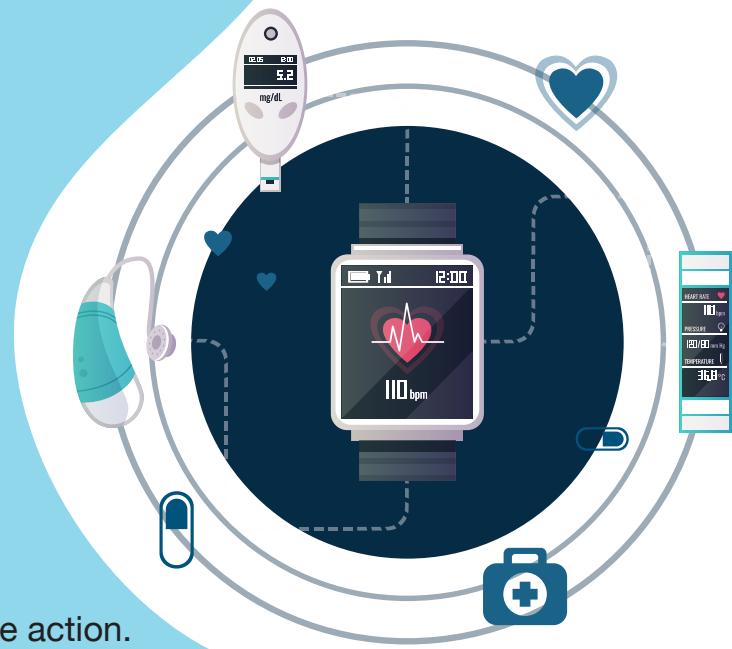
# CANCER

DNA sequencing has identified certain genetic markers for inheritable diseases as well as led to techniques for finding cancer cell markers in every individual. This method of checking for cancer cell markers through DNA sequencing is known as a “liquid biopsy” and currently can pick up over fifty possible cancers. Allied with Personalized Medicine, this could lead to a breakthrough in cancer detection and treatment for ‘at-risk’ individuals. Polygenic risk scores based on different genetic profiles could be assigned to individuals depending on their family history, demographics, and other analysable factors. Personalized Medicine could also lead to the development of medicines tailored at specific cancer cells which would destroy only those cells. Current cancer treatment such as chemotherapy and radiation destroy large amount of healthy and non-cancerous cells leading to various side effects. This could be avoided entirely, and viruses or nano particles could be used to target only those cells which could lead to cancer.

# WEARABLES

It is now becoming more common place to wear an Apple Watch to monitor our exercise routines or our basic health parameters like heart rate or blood pressure. Artificial Intelligence can monitor many more factors like sleep rhythms, breathing, weight, blood sugar and blood oxygen levels. Constant monitoring can alert us to changes in ourselves and allow us to take immediate action.

We could aim at optimising our lifestyles while receiving constant feedback on whether we are doing the right or wrong things. We could try out new diets and get instant and continuous feedback on our weight loss. We could experiment with new exercise regimens and see how they are affecting us in real-time. Diabetes, anxiety, depression, insomnia, and obesity could be headed off early, and healthy habits could be encouraged. Eventually, everyone could be monitored by a wearable leading to better health for everyone.



# SUPPLEMENTS

In addition to our daily diets, many individuals find themselves in need of additional vitamins and minerals. This is either due to genetic reasons, environmental ones like where they live or what work they do, or lifestyle choices. Vegans often need additional sources of Vitamin B12, and vegetarians sometimes need protein supplements. People living in cold, cloudy countries may need additional Vitamin D which comes from sunlight, as will people who work underground or in offices all day. Individually tailoring these vitamins and supplements can be a problem especially since it requires constant monitoring. Personalized Medicine can solve this problem and can additionally come up with new warnings or suggestions depending on how you react to a specific place or a specific routine.



# THE EFFECT OF **PERSONALISED MEDICINE** ON OUR LIVES WILL BE EXCEPTIONAL



These are all wonderful new areas where Personalized Medicine can be extremely effective even today or in the near future. As more and more healthcare professionals wake up to the immense possibilities of this new medical field, attention is being focused on specific applications. Personalized or Precision Medicine research is currently underway at the Hamad Bin Khalifa University as well as in various other centres in the Middle East, Stanford and Harvard Universities in the United States, the American National Cancer Institute, University College London, and Garvan Institute of Medical Research in Australia. Quickly moving from the theoretical to the practical realm, Personalized Medicine is fast becoming the most promising new field in medical science. Perhaps more than any other medical advance, the effects of Personalized Medicine on all our lives will be unprecedented as well as transformational.



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*Thank you*

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