Weill Cornell Medicine-Qatar

WCM-Q study provides insights into disease

Doha – April 22, 2018: Researchers at Weill Cornell Medicine - Qatar (WCM-Q) have used comprehensive molecular measurement techniques to better understand how our cells respond to disease.

Dr. Karsten Suhre, professor of physiology and biophysics and director of the college's Bioinformatics Core, lead a team of researchers from institutions across the globe who studied how individual differences in lifestyles and health leave an imprint on a person's epigenome – a series of chemical modifications to a person's genome that have the ability to switch genes 'on' or 'off'.

They researched how disorders like diabetes, cancer and cardiovascular disease, in conjunction with exposure to environmental factors like smoking and lack of exercise, affect the biochemical make-up of small molecules and proteins as they circulate within the human body.

Dr. Suhre says: "Complex disorders, including extreme obesity, cardiovascular disease and diabetes, as well as lifestyle choices, such as exposure to cigarette smoke or unhealthy food choices, force our body to respond by eliminating toxic molecules from the body.

"This response leaves so-called epigenetic marks on the genome which tell the cells which genes they need to activate. Epigenetic marks are like little flags – their presence or absence at specific locations on the genome can tell how well a cell is faring in its response to a health challenge. For instance, some of them can serve as early indicators for the onset of diabetes."

Their study was entitled 'Deep molecular phenotypes link complex disorders and physiological insult to CpG methylation' and is the first study that analyzes such a broad spectrum of molecular measurements, including metabolomics, lipidomics, proteomics and glycomics to measure all possible kinds of small molecules that can be found in blood, urine and saliva.

This study has now been published in the prestigious international journal *Human Molecular Genetics* and can be accessed at the following URL: https://doi.org/10.1093/hmg/ddy006.

Dr. Shaza Zaghlool, the first author of the study and who performed all the data analyses, explained: "If your pancreas is already crumbling because you have diabetes, then it is already very late to intervene, but if we can spot the disease earlier by looking at some of the markers we identify in our study, there may be room for intervention."

She added: "Knowing that certain factors are associated with each other is only a first step in dealing with the problem. Understanding which of these factors are actually driving the disease will allow us to pinpoint specific molecules that we can target with drugs. This is what we started to do. It's about an integrated approach to developing new therapies."

Dr. Khaled Machaca, associate dean for research at WCM-Q, said: "These biomarkers could help with the early diagnosis of certain cancers, diabetes, or cardiovascular disease, and may one day allow

doctors to begin therapies earlier, ultimately improving clinical outcomes. These biomarkers could also allow patients to make timely lifestyle changes, perhaps even avoiding the disease altogether. The results of this study advance WCM-Q's research program on addressing the most prevalent and challenging health needs in Qatar and the region."

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About Weill Cornell Medicine - Qatar

Weill Cornell Medicine - Qatar is a partnership between Cornell University and Qatar Foundation. It offers a comprehensive six-year medical program leading to the Cornell University M.D. degree with teaching by Cornell and Weill Cornell faculty and by physicians at Hamad Medical Corporation (HMC), Aspetar Orthopedic and Sports Medicine Hospital, the Primary Health Care Corporation, the Feto Maternal Center, and Sidra Medicine, who hold Weill Cornell appointments. Through its biomedical research program, WCM-Q is building a sustainable research community in Qatar while advancing basic science and clinical research. Through its medical college, WCM-Q seeks to provide the finest education possible for medical students, to improve health care both now and for future generations, and to provide high quality health care to the Qatari population.

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