Northumbria University
NEWCASTLE

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Pedalling towards better diabetes management

Newcastle scientists will be studying the physiological performance of cyclists 1,000 miles away as they tackle a gruelling ride and diabetes at the same time.

The researchers from Newcastle and Northumbria Universities want to determine what lessons can be learnt from the body function of elite athletes to help anyone managing Type 1 diabetes. The team will be continually monitoring the performance of the riders day and night thanks to the latest innovative technological biosensors, mobile and cloud technologies.

Thirty six athletes, most with Type 1 diabetes, are among 60 riders taking part in the mHealth Grand Tour from Brussels to Barcelona. Over 13 punishing days they will be cycling over 2,100 kilometres with 22,000 meters of climbs. In the first ever trial of its type, exercise performance and physiological data will be streamed over mobile phone networks and the internet to scientists watching in real time in another country.

The research study brings together three types of riders; elite athletes with Type 1 diabetes, recreational riders with Type 1 diabetes and athletes who do not have diabetes.

They will wear continuous glucose monitors that are attached to the skin. As they cycle, a heart rate monitor and a bike computer will record cycling statistics such as speed.

The data from all of these sensors will be transmitted wirelessly to the riders' smartphones, allowing them to track their health and performance, and to a live web portal and the cloud. This will then be downloaded from the cloud for analysis by a scientific team at Newcastle and Northumbria Universities, UK.

Professor Mike Trenell, Director of MoveLab and NIHR Senior Fellow at Newcastle University, who is leading the trial said: "This is a unique study which demonstrates the potential for technology to help people with Type 1 diabetes perform as athletes at the highest level.

"We will be gathering minute by minute data, day and night from the three groups allowing us to analyse how their bodies are coping. This will provide information on how athletes with Type 1 diabetes cope with prolonged physical stress.

"We also aim to demonstrate that we can use technology to help people with Type 1 diabetes perform high levels of exercise safely on the top of a French Alp whilst collecting data from an office in Newcastle. It is really about demonstrating how much things most of us carry in our everyday lives, mobile phones, hold the potential to help living with diabetes."

Diabetes is a growing problem globally and according to Diabetes UK figures there are 2.6 million people diagnosed with the condition. In Europe 8.5%, of

the European population or some 63 million people, have Type 1 or Type 2 diabetes today and this figure is increasing year-on-year. In the UK about 2,000 children are diagnosed with Type 1 diabetes each year.

Type 1 diabetes is caused by the body not being able to produce insulin, the hormone which tells the body to absorb sugar or glucose. If the amount of glucose in the blood is too high, it can seriously damage the body's organs. Conversely, if the level of glucose is too low, called hypoglycaemia, it can cause patients to shake, become confused, pass out and can cause serious problems if not remedied.

Type 1 diabetes is not curable and patients have to take insulin injections for life and ensure their blood glucose levels stay balanced by eating a healthy diet, taking regular exercise and having regular blood tests.

However, although exercise is beneficial for people with Type 1 diabetes, many people with the condition are deterred from exercise because of the risk of getting a low blood sugar level.

Dr Daniel West senior lecturer in Exercise and Health Nutrition at Northumbria University is overseeing the riders while on the continent. He said: “When someone with Type 1 diabetes becomes more physically active, they also become more insulin sensitive so their body responds more quickly and this may disrupt their diabetes control. If, when we have studied the data, we are able to determine what is different in how the athletes respond then we can draw lessons for the wider population living with Type 1 diabetes and improve the advice we offer about how to take up more exercise safely.”

Professor Paul Watson, Director of the Digital Institute at Newcastle University said: “Mobile devices backed by cloud computing will revolutionise healthcare by allowing people's health to be monitored and analysed wherever they are, not just when they are able to attend a clinic. Clouds provide the computing power needed to store and process the vast amounts of data that this will generate. This study is an important demonstration of this new approach.”

The mHealth Grand Tour is presented jointly by the GSMA, which represents the interests of the worldwide mobile communications industry, and the International Diabetes Federation, European Region, under the patronage of

European Commission Vice President Neelie Kroes. The Tour promotes awareness of diabetes and the development and delivery of mHealth. The scientists will be using data captured and transmitted wirelessly through a collaborative technical solution provided by ANT+, Dexcom, HMM, McCann Health, Orange and Sony Mobile.

Live streaming of the data from the trial will be shown at Newcastle University, the host of the British Science Festival, from 7-12 September. Northumbria University and Newcastle City Council are associate partners for the Festival which is one of Europe's largest and longest-running public science events and will provide Newcastle with a unique opportunity to showcase its impressive scientific and technological credentials to the world.

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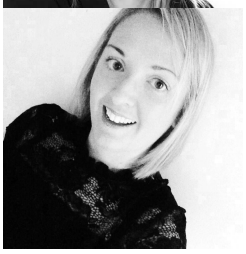

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