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Diet determines drug dosage

The University of Sydney
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Cooking vegetables like cabbages, cauliflower and broccoli in curries can inhibit the enzyme CYP1A2.

A University of Sydney PhD student has discovered the different diets and lifestyles of South Asians compared to Europeans could lead to the two groups requiring very different doses of medicines commonly used to treat illnesses such as depression and psychosis.

Vidya Perera, a final year PhD student in the Faculty of Pharmacy, has found that people from South Asia could need lower doses of these medicines because they are likely to have lower levels of CYP1A2, an enzyme that metabolises drugs.

"Vegetables such as cabbages, cauliflower and broccoli are known to increase levels of CYP1A2, as was demonstrated in this study and previous studies in people of European background. The lower levels of CYP1A2 in South Asians, however, appears to be due to the common practice of cooking these vegetables in curries using ingredients such as cumin and tumeric, ingredients known to inhibit the enzyme, overriding the effect of the vegetables," Mr Perera explained.

Mr Perera has just been declared the NSW winner of the AusBiotech/GlaxoSmithKline Student Excellence Awards as a result of his research.

"I started out looking for genetic differences between the two groups to account for the differences in CYP1A2 activity. What was fascinating to discover is that genetic differences only accounted for 3 per cent of variability in CYP1A2 activity, while environment and lifestyle factors accounted for 35 percent of the differences," Mr Perera said.

A total of 332 people took part in the study - 166 South Asians and 166 Europeans. CYP1A2 levels were measured by giving participants a caffeine tablet, and analysing CYP1A2 enzyme activity in saliva samples four hours later. Demographic, dietary and lifestyle information was obtained using a questionnaire.

"Most drugs are approved in clinical trials conducted in Europe and North America using healthy, middle-aged European men," Mr Perera explained. "This is the first study to look at CYP1A2 activity in South Asians. Understanding the correct dose of a medicine is crucial to achieving beneficial results and avoiding adverse drug reactions."

Professor Andrew McLachlan, Associate Dean (Research) in the Faculty of Pharmacy and Mr

Perera's PhD supervisor, commented on the significance of this research.

"The development and testing of medicines is a global enterprise. The highest population growth is occurring in South Asia, yet we know relatively little about how to translate research findings between different populations of people."

"This research, for the first time, unpacks the complex interplay of factors that can affect how people breakdown and eliminate medicines from their body."

"Past research has attributed differences between people from different geographical regions to result from genetic differences. This important research highlights how dietary and cultural factors can impact on pharmacological response."

Mr Perera will travel to Adelaide this weekend to compete before a panel of judges in the national final of the AusBiotech/GlaxoSmithKline Student Excellence Awards. He will present his research on Sunday, with the winner to be announced on Monday.

AusBiotech 2011 is the annual conference of AusBiotech and the premier biotechnology and life sciences conference for Australia and the Asia-Pacific, attracting over 1400 delegates from across the world each year.