

Abnormalities within muscle signaling pathways may influence insulin resistance among South Asians

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South Asian people appear to have lower levels of a protein that affects glucose metabolism in their muscle cells than other Asian ethnic groups, which could explain their propensity toward type II diabetes. Credit: sunabesyou/iStock/Thinkstock

Ethnicity plays a significant role in the likelihood of developing certain diseases, such as diabetes. South Asians, for example, are known to be more insulin resistant than other Asians, and scientists have long believed that this is because South Asians tend to accumulate fat around the waist more than other Asian ethnicities. Now, a team of researchers from Singapore, including scientists at A*STAR, have established that problems with muscle insulin signaling pathways, rather than how fat is

distributed, may explain these differences in insulin resistance.

The body naturally regulates [blood sugar](#) levels by releasing the [hormone insulin](#). When blood sugar goes up in a healthy person, insulin is released to stimulate organs such as the muscles to absorb glucose and either use it or store it as a future source of energy. In individuals with insulin resistance, this process does not work efficiently, meaning that the body has to release higher levels of insulin to lower glucose levels. Generally, when people become more obese, they become more insulin resistant.

E. Shyong Tai and co-workers at the National University of Singapore, in collaboration with scientists at three A*STAR facilities, show that insulin resistance in South Asians is less affected by obesity and fat distribution than in people of Chinese and Malay origin.

"In 2011, we realized that insulin resistance is more complex than differences in obesity levels," explains Tai. "However, only recently could we take measurements on a large-enough scale to properly understand the mechanisms."

Tai and his team investigated 264 healthy adult males comprising 101 Chinese, 82 Malays and 81 South Asians. They measured the distribution of body fat in all the individuals, as well as the levels of proteins linked to glucose metabolism in muscle cells in the Chinese and South Asian groups.

Although obesity was associated with increased insulin resistance in all three ethnic groups, the team found that the effects were far more pronounced in Chinese and Malays. More surprisingly, lean South Asians were also found to be insulin resistant.

"The levels of some proteins involved in [glucose metabolism](#) in the skeletal muscles of South Asians were lower than in their Chinese

counterparts," explains Tai. "These associations seem to be obesity-independent."

Further research into the muscle samples taken from South Asians may help the team identify novel pathways relevant to [insulin resistance](#). This could lead to new ways of preventing or treating type II diabetes.

More information: Khoo, C. M., Leow, M. K.-S., Sadananthan, S. A., Lim, R., Venkataraman, K. et al. "Body fat partitioning does not explain the interethnic variation in insulin sensitivity among Asian ethnicity: The Singapore adults metabolism study." *Diabetes* 63, 1093–1102 (2014). [dx.doi.org/10.2337/db13-1483](https://doi.org/10.2337/db13-1483)

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