

Fat and obesity gene also affects hip fracture

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Australian researchers have demonstrated a strong association between the FTO (fat and obesity) gene and hip fracture in women. While the gene is already well known to affect diabetes and obesity, this is the first study to show that its high-risk variant can increase the risk of hip fracture by as much as 82%.

The study, undertaken by Dr Bich Tran and Professor Tuan Nguyen from Sydney's Garvan Institute of Medical Research, examined six gene variants ([single nucleotide polymorphisms](#), or SNPs) of the FTO gene, taken from the DNA of 943 women in the Dubbo Osteoporosis Epidemiology Study (DOES). The women were all over 60, and their bone health was followed between 1989 and 2007. During that period, 102 women had hip fractures.

On average, the risk of fracture is about 11%. The study showed that if a woman has a low-risk genotype, or [gene variant](#), the risk of fracture is 10%. If she has a high-risk genotype, it is 16%.

Now published online in *Clinical Endocrinology*, the authors believe that the findings have the potential to improve prediction of [hip fracture](#). Known risk factors, also to be taken into account, include advancing age, falls, history of fracture, low [bone mineral density](#), low [body mass index](#) (BMI) and genetic make-up.

"We found that for a woman of the same age and same clinical risk factors, those with the high-risk genotype have an increased risk of hip fracture of 82% - a strong effect in genetic terms," said Professor Tuan

Nguyen.

"A genome-wide association study published in 2007 suggested that genetic variants in the FTO gene were associated with variation in BMI. This led us to hypothesise that they might also be associated with variation in hip fracture risk, because BMI is a strong predictor of fracture."

"The present study tested our hypothesis by examining the association between common variants in the FTO gene and hip fracture."

"Our results showed a strong association with hip fracture, with some gene variants doubling the risk of fracture. Interestingly, this effect was independent of both the bone density and BMI of the women we studied."

"We also found that the FTO gene expresses in bone cells, and may have something to do with bone turnover, or remodelling, although its exact mechanisms are unclear."

"It's important to emphasise that, while promising, our finding is a first step. It will need to be replicated in other studies, and its mechanisms clearly understood before it is useful in drug development."

"At Garvan, we developed a Fracture Risk Calculator several years ago, <http://www.fractureriskcalculator.com>, using data from the Dubbo study. The calculator, which is fairly accurate and easy to use, is very popular with patients and doctors."

"In the future, I would anticipate that genetic risk factors including this finding would be programmed into the calculator, making it an even more finely tuned predictive tool."

Provided by Garvan Institute of Medical Research

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