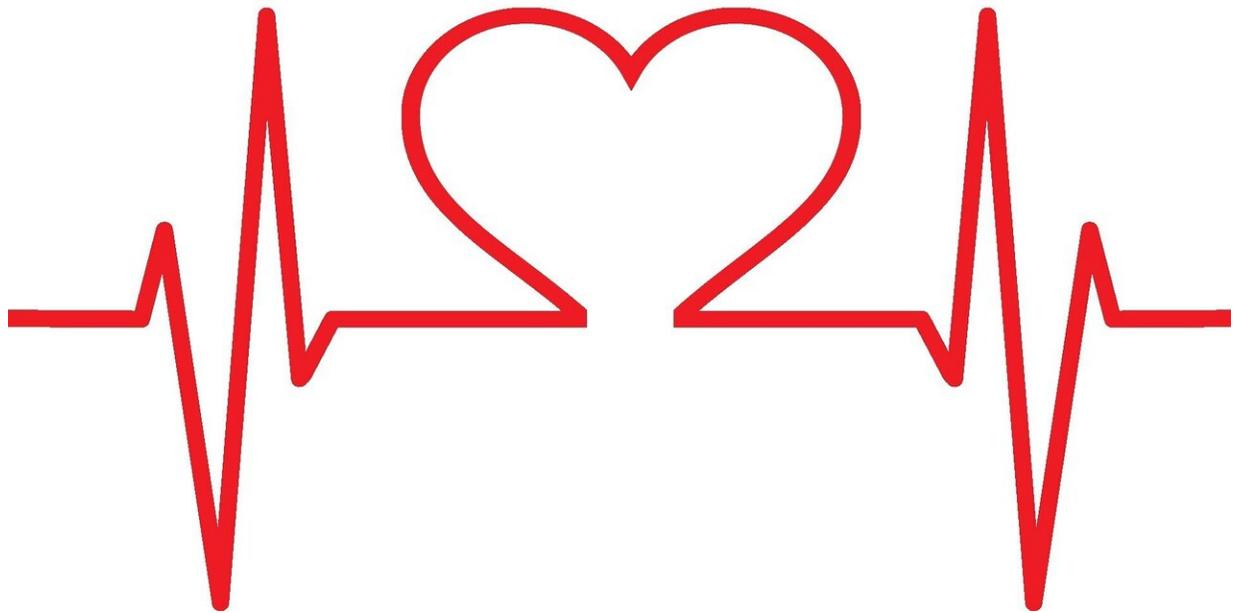


# Genetic variants with possible positive implications for lifestyle

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A German and British research team lead by Technical University of Munich (TUM) has examined the interplay between genetics, cardiovascular disease and educational attainment in a major population study. Genetic variants which had been linked to educational attainment in other studies were observed in the subjects. The researchers found that these variants also had implications for a more health-conscious lifestyle and thus a lower risk of cardiovascular disease—in some cases

regardless of the level of education.

It has long been known that individuals with higher educational attainment are less likely to suffer heart attacks in later life. Prof. Heribert Schunkert and his team have now examined this link in a major study that has focused on the genetic dimension for the first time. Schunkert is Director of the Cardiology Department and Medical Director of the German Heart Center Munich and a professor at TUM as well as scientist at the German Centre for Cardiovascular Research.

## **Genetic variants as markers**

The study was based on SNPs (single nucleotide polymorphisms), which are thought to influence school attainment. SNPs are small variations in the genetic code which may be linked to particular traits, abilities or disease risks. Heribert Schunkert and his team began by studying 74 of these SNPs, known as the "variants associated with educational attainment". Previous scientific studies conducted between 2016 and 2018 (see publications listed below) have shown that these variants have a positive influence on the years of schooling completed. They accounted for around 11 percent of the differences between the subjects with respect to the length of education.

In an initial study, Schunkert and his team examined data from around 13,000 patients with cardiovascular disease and 14,000 case-control subjects largely from Germany, England and the United States. It emerged that the risk of developing cardiovascular disease was approximately 21 percent higher if an individual belonged to the fifth of the population with the lowest score of genetic variants associated with educational attainment. On average, these individuals also had a lower level of education and had spent fewer years in school.

"Our findings suggest that these genetic factors not only affect

educational attainment to a certain extent, but also the risk of subsequently developing cardiovascular disease," explains Schunkert. He adds: "We are of course aware that several other factors play an important role in educational attainment—including upbringing and the education level of the parents—but we did not examine these in our study."

The study also revealed the reasons behind an elevated risk of developing cardiovascular diseases. The team was able to prove statistically that individuals with a lower score of genetic variants associated with educational attainment were more likely to smoke, be overweight and suffer from high blood pressure.

## **Variants associated with educational attainment also have implications for a health-conscious lifestyle**

The scientists went on to confirm their findings using another large database encompassing some 500,000 people in the UK, and they also increased the number of SNPs in their study to over 1,000. Here too, they arrived at the conclusion that the variants associated with educational attainment have a positive impact on the risk of a [heart attack](#).

The next step for the researchers was to use statistical calculation methods to test how strongly the risk of developing cardiovascular disease was impacted directly by schooling and how big a role is played by genetics. For this purpose, the relationship between genetic variants and educational attainment was statistically cleansed, i.e. adjusted for the actual years of schooling completed. Surprisingly, the association between genetic variants and the risk of heart attack remained significant.

Prof. Schunkert explains the finding: "This protective effect against cardiovascular [disease](#) cannot be attributed to educational attainment alone—it is clear that genetic make-up also has a strong influencing role. In other words, the inherited traits that contribute to an individual's success in school also have an impact—regardless of [educational attainment](#)—on a more health-conscious lifestyle in later years." The researchers in Schunkert's team have been identifying the [genetic factors](#) that influence [cardiovascular disease](#) for several years.

**More information:** Zeng L et al. Genetically modulated educational attainment and coronary disease risk, *European Heart Journal*, June 6, 2019, [DOI: 10.1093/eurheartj/ehz328https://academic.oup.com/eurheartj/article/40/29/2413/5512096](https://academic.oup.com/eurheartj/article/40/29/2413/5512096)

Lee JJ et al, Gene discovery and polygenic prediction from a genome-wide association study of educational attainment in 1.1 million individuals, *Nature Genetics* (2018). [DOI: 10.1038/s41588-018-0147-3](https://doi.org/10.1038/s41588-018-0147-3)

Okbay A. et al., Genome-wide association study identifies 74 loci associated with educational attainment, *Nature*, May 11, 2016, [DOI: 10.1038/nature17671https://www.nature.com/articles/nature17671](https://doi.org/10.1038/nature17671https://www.nature.com/articles/nature17671)

Provided by Technical University Munich

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