

# The National

## Code to the heart

Laura Dixon

Last Updated: February 02, 2009 3:13PM UAE / February 2, 2009 11:13AM GMT

Researchers have got to the bottom of one of the world's most complex health questions: just why does India have such a high incidence of heart disease?

It has been predicted by the World Health Organisation that by 2010 the subcontinent's population will account for 60 per cent of the world's heart disease patients.

Diet and lifestyle were previously blamed for its peculiar geographical spread, but new research points the finger at genetics. With results affecting 60 million people of South Asian descent, scientists have identified a single genetic mutation that makes them seven times more likely to develop heart disease.

An international team of scientists discovered the mutation, a deletion of 25 letters of genetic code from the heart protein gene MYBPC3, which is largely restricted to people from the Indian subcontinent.

Typically, carriers show few symptoms until middle age, but after that age, most suffer from heart disease to varying degrees, including total heart failure. Across the world, the gene affects one in 100 people; in India it is one in four.

The researchers looked closely at the diverse ethnicity of India to establish whether certain groups were immune. The code was found throughout India with the exception of north-east Indians, recent African immigrants and people of the Andaman Islands, and is most prevalent in southern and western India, affecting those of all castes and religions.

"The bad news is that many of these mutation carriers have no warning that they are in danger," Dr Perundurai S Dhandapany, the lead author of the report from Madurai Kamaraj University in Madurai, India, explained when it was published. "The good news is that we now know the impact of this mutation."

This research adds to our understanding of heart disease and to the extensive genetic research that has been carried out in recent years, particularly by the British Heart Foundation, to understand how it is passed on and how to treat those who have genes that are predisposed towards the condition.

The effects of the mutation vary from person to person, but with the new findings, it is hoped that carriers could be identified at a young age by genetic screening. Then they could adopt a healthier lifestyle to avoid its worst effects later in life.

Professor Peter Weissberg, the medical director at the British Heart Foundation, has underlined that this study doesn't yet provide any hope for future sufferers, however.

"There is no evidence yet that early detection will lead to improved outcome since we have no idea if the outlook for this group can be modified by conventional heart failure treatments," he said following the release of the results.

"Much more research is needed, firstly to see if less dramatic changes in the same gene lead or predispose people to more common forms of heart failure, and secondly to see if treatments can be developed to improve the outcome for patients who carry the mutation."

Along with this genetic factor, there are a number of other risk factors associated with South Asians. These include high blood cholesterol, unusual lipid biochemistry, narrowed arteries and a genetic predisposition to develop diabetes. So while the research is valuable, it's by no means the only thing behind the subcontinent's epidemic.

Does this mean, then, that lifestyle factors like eating food that is low in fat and exercise have little impact on the likelihood of contracting heart disease?

There's no evidence yet of the relative risks of following an unhealthy lifestyle versus having this genetic mutation, but research carried out in 2007 in Iceland, America and Canada had some interesting results on the matter.

The researchers discovered a set of DNA that puts Caucasians at greater risk of a heart attack regardless of their lifestyle habits. Dr Kari Stefansson of DeCode Genetics in Iceland suggested that this genetic coding might be behind one fifth of heart attacks among white Europeans and North Americans.

His team hoped that this could identify those at greater risk and eventually develop custom-tailored treatments.

However, Professor Ruth McPherson from the University of Ottawa noted that the effect of the gene was less detrimental than the effect of smoking or having a high cholesterol level, which underlines the important message that while genetics is influential, it's only part of a much bigger and more complex issue, which certainly links to diet, exercise and blood pressure.



An Indian man smokes a bidi, a leaf hand-rolled with tobacco in New Delhi. While genetics has been blamed for many of the heart disease cases in India, lifestyle factors such as smoking remain significant. Manan Vatsyayana / AFP

Looking beyond the subcontinent, successful genetic research has been pioneering ways to measure vulnerability to heart disease over the years, and it continues to illuminate areas of this complex condition to help understand it more thoroughly.

One of the most common and life-threatening inherited conditions is hypertrophic cardiomyopathy, a condition where the heart muscle becomes thickened. Its symptoms vary, but in the worst cases, it can cause sudden cardiac death, particularly in young athletes.

Genetic research has shown that most cases are hereditary and screening is now widely available. With this condition, treatment is available too, so the genetic research has had a direct impact and certainly saved lives.

Another of the hereditary conditions that can lead to heart disease is familial hypercholesterolaemia. This condition puts sufferers at risk of early heart attacks, largely due to the dangerously high levels of cholesterol in their blood.

It's an inherited condition and, once it is identified, doctors can prescribe medication and lifestyle changes to keep it under control and reduce its impact.

You might wonder why such dangerous genes are still getting passed on instead of gradually being erased from the population. This might be what happens in a number of other fatal diseases, but not in this case.

Because of the late onset of the condition, typically post-40 with the South Asian mutation, it has been able to spread widely, only coming to light as a condition after the carrier has had children and passed it on.

According to the British Heart Foundation, heart disease is not thought to be dependent on a lone gene, but on a wider region of DNA. We know that a series of genes is responsible, and the cumulative effect seems to predispose sufferers to coronary heart disease.

Research has grown in the area of genetics and heart disease, so that our understanding has rapidly evolved. In the future this could lead to an ability to predict heart disease and to tailor treatments to individuals.

What happens, though, if you find out that you are genetically predisposed to having heart disease? Identifying your vulnerability certainly doesn't do anything to change it (for the moment, at least).

While medical advances naturally lag behind genetic research, the current advice centres on lifestyle factors. Dhandapany has emphasised that this will still be crucial in the future too, when genetic screening programmes have been set up for at-risk South Asians.

"Prevention is better than cure, so genetic counselling can be employed for such patients, giving particular emphasis on lifestyle."

As previously mentioned, the cumulative effect of being genetically predisposed to heart disease and following a lifestyle that inhibits heart health is a sure-fire way to suffer.

The WHO has a series of leaflets and information specifically designed for those with high cardiovascular risk and includes intensive lifestyle advice and drug treatment as part of those preventive measures.

Diet is crucial – and its specific advice suggests consuming less than 30 per cent of fat in your daily diet, less than 5g of salt per day and making sure you include 400g of fruit and vegetables, as well as pulses and grains, in your daily meals.

It also advises giving up smoking, avoiding passive smoking where possible and reducing blood pressure.

A programme of light to moderate exercise should also be followed, and these lifestyle changes ought to be effected with the advice of a specialist doctor, who may also be able to prescribe drugs to reduce your risks further, depending on your individual situation.

It is hoped that future research will be able to develop drugs that could particularly affect the specific mutation in South Asian sufferers and postpone the onset of symptoms. There is a market of 60 million people waiting, after all.

But in the meantime, for those who haven't been screened as well as those who have, the best advice is the well-known common sense version: eat well, exercise, don't smoke and look after your body for your best chance to fight heart disease.

Have your say

Please [log in](#) to post a comment