
Twin & Family Research Update

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The purpose of our research

The main purpose of all our research studies is to look at the relative influences of heredity (inheriting genes) and environment on variations in the health of people.

What have we found so far?

Alcohol

Drinking habits are partly determined by the genes we inherit. Non-identical twins have drinking habits which are much less similar than the drinking habits of identical twins. This is true even when the twins have been living apart for several years. We have discovered a variant of a gene called *alcohol dehydrogenase* which appears to protect about 10% of Australians from excessive drinking and developing problems with alcohol. We are now conducting another major research program to discover other genes which influence drinking habits and risk of alcohol dependence.

Smoking

The decision to start smoking is influenced by genetic factors as well as environmental circumstances such as social attitudes and peer group influence. Identical twins are more alike than non-identical twins in their smoking behaviour. We are currently conducting a major genetic linkage study with Australian twins and their families to try to identify the genes responsible for nicotine dependence.

Depression and anxiety

There is strong evidence for a genetic basis to depression and anxiety and we have a major project underway to find the genes responsible.

Cardiovascular health

Cardiovascular disease remains Australia's leading cause of death and we have an active research program investigating genetic influences on cholesterol and other lipids and apolipoproteins whose levels influence risk of heart attack and stroke. DNA from 1000 of the twin pairs in our studies is currently being typed for 1000 genetic markers to identify genes which influence cardiovascular risk factors.

Asthma, hayfever, eczema

Asthma and hayfever are both influenced by inherited factors, and it seems that these also influence the tendency to develop eczema and food and dust allergies. We are conducting a study on the genetics of eczema and are trying to find pairs of twins and siblings who both suffer(ed) from childhood eczema.

Twinning

Why do twins run in some families? The tendency to conceive non-identical twins results partly from the mother's inherited risk for increased multiple ovulation (more than one egg ripening at a time). However, the mechanisms for this are not yet known so research to understand the genetics of non-identical twinning is continuing.

To complete the twinning study we need help from sisters who have both conceived non-identical twins. If you and your sister have conceived non-identical twins and would like to participate from anywhere in Australia, please contact the Project Coordinator, Alison MacKenzie, on Free call 1800 632 576.

We are always happy to answer your questions. If you'd like to contact us, please call our

Free call number: 1800 257 179

You can also visit our website at <http://www.qimr.edu.au/research/labs/nickm/>

Thank you for your ongoing support and very best wishes to you

Gambling

Problem gambling has recently become a major public health concern. In particular, the number of gambling venues, the number of people who gamble, and the number of gambling problems in Australia are quite likely the highest in the world, and are certainly the highest among the English-speaking nations. Until recently, genetic research into problem gambling has been relatively ignored by the research community. We are now conducting a major genetic study with twin pairs to discover the causes of problem gambling among both women and men.

Hand Preference (Right & Left Handedness)

We are studying the direction and consistency of hand, foot and eye preferences as they are associated with different patterns of brain organisation, autism and schizophrenia. The data from Australian twins are being used in a large international study involving over 15,000 twin pairs. Preliminary results suggest that the direction and consistency of preference is heritable and that the same genes may be influencing hand, foot and eye preference.

A Family Study of Melanoma

It is well known that Queensland has the highest incidence of melanoma in the world, with 1 in 13 men and 1 in 16 women affected. QIMR is now following up families who participated in earlier melanoma studies that began in Queensland in the early 1990s. The goal of this study is to look at the effects of environment and genes on our risk of developing melanoma. So far 1354 families have been invited to participate in the study, which will soon be coming to a close.

Migraine

Typical migraine is a frequent, debilitating and painful disorder that normally affects people during their most productive years (up to 25% of females and 7.5% of males in Western populations). Several studies have shown there is a relationship between psychiatric disorders (namely anxiety and depression) and migraine in community samples. We are currently conducting a project with Australian twins and their families to identify susceptibility genes and

to confirm previously reported susceptibility genes for migraine and co-occurring psychiatric disorders.

Adolescent Twins

The Twin Mole study, which started in 1992, looks at the number and distribution of moles. This is important because a high density of moles is a high risk factor for melanoma. (Other risk factors include high sun exposure, fair colouring and freckling). So far, more than 600 twin families have taken part. We have found that the number of moles on individuals varies enormously from almost zero to over 300.

Interestingly, identical twins have almost the same number of moles but non-identical twins are much less similar in both number and positioning of moles. This suggests moliness is strongly influenced by genes, although sun exposure is also a major factor.

We are now using genetic linkage mapping to search for these genes. So far a region on chromosome 9 has been found to account for 33% of the genetic variance in mole count, although this is not necessarily the only cause. A genome-wide scan is now underway to detect other genes, which cause melanoma. For more information about adolescent twin research please visit our website at:

<http://genepi.qimr.edu.au/twinsreq.html>

Other research in progress

Currently we are conducting new twin and family studies which look at the genetic and environmental influences on:

- personality differences
- endometriosis
- reading ability
- the ability to taste and smell
- early childhood experiences

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