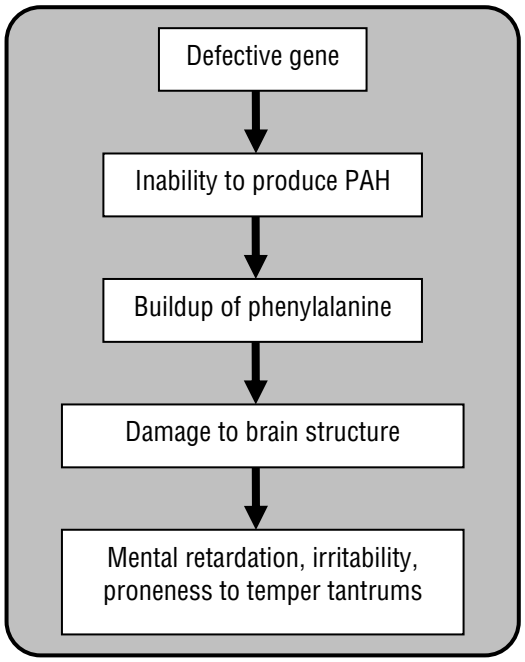
Genetic influences on behaviour

This activity will help you to…

- Understand how genes may affect behaviour
- Consider the nature of the gene-behaviour relationship

Genes for behaviours?

It is common to read in the press of scientists discovering 'genes for' particular behaviours. This has led to a common misconception that there is a one-to-one correspondence between particular genes and particular psychological or behavioural traits. The relationship is far more complicated than this. What genes do is transmit instructions to make proteins. The proteins they do (or do not) make may then ultimately influence behaviour through a huge variety of different routes that involve both biological and environmental influences.



For example, phenylketonuria (PKU) is a highly heritable form of mental retardation. It is caused by a defective gene that leaves a person unable to metabolise a particular amino acid (PAH). The resulting build-up of PAH causes structural damage to the brain, causing the psychological and behavioural PKU traits.

It is important to realise that even this highly heritable trait, linked to a very specific genetic abnormality, is still responsive to the environment. If a child is known to be carrying the PKU gene its diet can be modified to reduce PAH levels, thereby reducing the degree of psychological abnormality.

This illustrates how genes and environment interact to produce behaviour. Imagine, by way of further example, that there was a gene that increased a person's chances of becoming dependent on alcohol. Carrying the gene would not guarantee that the person would become alcoholic; this would only be likely to occur if the person's environment supplied opportunities to consume alcohol. So a carrier's eventual behaviour would differ depending on whether they grew up in a community or society where alcohol was readily available. Consequently, whether or not a gene is expressed may depend on the environment in which the carrier develops. Similarly, the same gene may express itself in different ways depending on environmental circumstances. Imagine a gene that increased (by some means) a person's tendency to take risks. Depending on the carrier's environment this might express itself as criminal behaviour, or as a fondness for adrenaline sports or as the type of entrepreneurial behaviour that makes some people very rich.

The press are fond of reporting 'genes for this' and 'genes for that', but quite clearly the actual gene-behaviour relationship can be very complex. How might we plausibly explain the following?

A gene for basketball	A gene for drug abuse	A gene for watching TV
A gene for bad driving	A gene for criminality	A gene for religiosity