Case study 1: Codine/Morphine

Morphine is a well known analgesic for moderate to severe pain relief. To achieve this pain relief patients are first administered the prodrug codeine (methylmorphine) which is a naturally occurring opiate. Codeine is metabolised in the liver by a specific enzyme known as cytochrome P450 2D6. This enzyme chemically converts codeine into active drug morphine which induces pain relief around the body (via a demethylation reaction).

Amongst the many factors which affect how well morphine works as an analgesic, genetic variation has been found to contribute to its effectiveness. Patients may have different genetic versions of cytochrome P450 2D6, which in turn will affect the enzymes ability to convert the prodrug codeine to morphine. This may leave some patients having a reduced pain relief response while in others morphine will act as a proficient analgesic. The prospect of pharmacogenetic testing, may allow clinicians to genetically test patients cytochrome P450 2D6 gene to link their variant to their response to morphine.