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Scientists reveal DNA danger from drinking alcohol

Rachel Allen

Drinking alcohol can cause irreversible damage to DNA leading to deadly conditions, Cambridge scientists have revealed.

A by-product of alcohol is toxic to blood stem cells according to experts at the Medical Research Council (MRC) Laboratory of Molecular Biology, but two vital mechanisms usually keep the damage at bay.

The study, published yesterday in *Nature*, showed mice without these mechanisms developed bone marrow failure, as their blood stem cells were obliterated.

The results are a breakthrough for people with a rare genetic disorder called Fanconi's Anaemia (FA) – as it explains why their bone marrow fails.

People with this disease inherit mutations which lead to the failing of the 'repair kit' that would fix DNA damage caused by the alcohol toxin.

Dr KJ Patel, who led the research, said: "Blood stem cells are responsible for providing a continuous supply of healthy blood cells throughout our lifespan. With age, these vital stem cells become less effective because of damaged DNA build-up.

"Our study identifies a key source of this DNA damage and defines two protective mechanisms that stem cells use to counteract this threat.

"Last year we published a paper showing that without this two-tier protection, alcohol breakdown products are extremely toxic to the blood.

"We now identify exactly where this DNA damage is occurring, which is important because it means that alcohol doesn't just kill off healthy circulating cells, it gradually destroys the blood cell factory.

"Once these blood stem cells are damaged they may give rise to leukaemias and when they are gone they cannot be replaced, resulting in bone marrow failure."

It is hoped the findings will be used to develop new treatments for the genetic condition, which currently has very poor prognosis.

The findings may also be significant for around a quarter of a billion people with alcohol-induced "Asian flush syndrome".

They are deficient in a specific [enzyme](#) that removes toxic acetaldehyde and may be unusually susceptible to DNA damage.



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