

## Why smoking is 'BAD' for the Fallopian tube -- and increases the risk of ectopic pregnancy

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Cigarette smoke reduces the production of a Fallopian tube gene known as "BAD", which helps explain the link between smoking and ectopic pregnancy. The finding, from scientists led by Drs Andrew Horne and Colin Duncan at the Medical Research Council (MRC) Centre for Reproductive Health in Edinburgh, UK, was described today at the annual meeting of ESHRE (European Society of Human Reproduction and Embryology) in Istanbul.

Ectopic pregnancy - when the [embryo implants](#) outside the uterus and in the [Fallopian tube](#) - occurs in up to 2% of all pregnancies and is the most common cause of [maternal death](#) in early pregnancy. There is currently no way to prevent an [ectopic pregnancy](#), and the condition must be treated by [abdominal surgery](#) or, when the ectopic is small and stable, by injection of a drug called methotrexate.

In presenting background information to the study, Dr Horne explained that ectopic pregnancy is the result of a combination of factors affecting the transport of the developing embryo from the Fallopian tube to the uterus and changes in the tubal environment which allow early implantation to occur. Smoking is known to be a major risk factor, but how smoking changes the environment of the Fallopian tube for an ectopic pregnancy to occur has so far remained largely unknown.

For the purpose of this study, Dr Horne's group first exposed cells from the Fallopian tube to a breakdown product of nicotine called cotinine. They then showed that cotinine had a negative effect on genes known to

be associated with cell death (or apoptosis), and in particular with a gene called BAD. In a further study the researchers showed that BAD expression was reduced in the Fallopian tube of women who were smokers.

Dr Horne explained that changes in the production of BAD and related genes are seen in the uterus as it prepares for normal implantation of the embryo and [early pregnancy](#). A reduction in the expression of BAD is normally seen in the cells of the uterus just before the embryo implants.

The results of this study, said Dr Horne, suggest that the reduced production of the BAD gene in the Fallopian tube leads to an environment like that of the uterus, which encourages and allows ectopic pregnancy to occur. "So our research," he added, "may in future help scientists find ways to prevent ectopic pregnancy, diagnosis it better, and treat it earlier."

He went on: "The research is exciting because it provides new scientific evidence to help understand why women who smoke are more likely to have ectopic pregnancies. It appears that smoking reduces the production of genes such as BAD which are involved in the control of cell death and promote an environment in the Fallopian tube which is attractive to the developing embryo.

"The information gained from this study can also be applied to other conditions caused by smoking, and could help us prevent or treat them better in the long term."

**More information:** A recent review of the effect of smoking on IVF outcomes has confirmed that smoking patients have a significantly lower chance of live birth and clinical pregnancy per cycle, and a significantly higher risk of spontaneous miscarriage and ectopic pregnancy than non-smoking patients. (Waylen AL, Metwally M, Jones GL, Wilkinson AJ,

Ledger WL. Effects of cigarette smoking upon clinical outcomes of assisted reproduction: a meta-analysis. *Hum Reprod Update* 2009; 15: 31.)

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