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Why smoking is bad for your fallopian tube

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Introduction - Cigarette smoking is a major risk factor for the development of tubal ectopic pregnancy. The pathophysiology of this association however is not fully understood. We aimed to investigate how smoking alters the function of tubal epithelial cells.

Material and methods - We exposed an oviductal epithelial cell line (OE-E6/E7) and primary explants of human Fallopian tubes to low (40ng/ml) and high (400ng/ml) concentrations of cotinine (the active metabolite of nicotine) and analyzed the effect on gene expression using Illumina Human HT-12 arrays. We followed up candidate genes informed by the array by immunohistochemistry and quantitative RT-PCR in Fallopian tubes of smokers and non-smokers.

Results - The pro-apoptotic gene BAD was significantly ($P<0.05$) down regulated in the explant and cell line cultures by both concentrations of cotinine. We carried out immunohistochemistry for BAD and the anti-apoptotic gene BCL-2 on non-pregnant luteal phase human Fallopian tubes (n=21), stratified into smokers (n=10) and non-smokers (n=11) by serum cotinine concentrations. BAD and BCL-2 protein were localized to the epithelium of the Fallopian tubes. BAD mRNA expression was reduced in the Fallopian tubes of smokers ($P<0.05$) and BCL-2 expression was increased ($P<0.05$). Blind assessment of Fallopian tube epithelial morphology revealed cell surface irregularity in the tubal epithelium of smokers ($P<0.05$).

Conclusions - These results suggest that smoking may alter epithelial cell turnover in the Fallopian tube and be associated with structural as well as functional changes. We believe that these changes may contribute to the development of ectopic pregnancy.