

ABSTRACT SUBMISSION FORM

LET'S TALK ABOUT

SEX + GENDER

Exploring the role of sex and gender on health research



CHR D 2020: Abstract Submission Form

Submitter Name

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Title

Maternal Diabetes and Smoking- The Impact on Asthma Development

Background

Asthma is an obstructive lung disease with both environmental and genetic components. Co-exposure to maternal diabetes and environmental tobacco smoke synergistically increases the risk for childhood asthma. It is unclear how maternal factors influence the function of airway smooth muscle (ASM), the major contributor to airway narrowing in asthma.

Objective

We hypothesize that exposure of ASM to hyperglycemia and nicotine will increase the abundance of ASM contractile gene markers and alter ASM proliferation.

Methods

Immortalized human ASM cells (htHASM) were cultured in low glucose (LG), or high glucose (HG) media with or without nicotine. Cells are from one male and two females. To assess changes in proliferation, cells were manually counted 3 and 5-days post exposure and normalized to baseline. Changes in contractile and synthetic phenotypes were measured using qPCR in htHASM serum deprived for 7 days in the aforementioned culture conditions. Relative abundance of transgelin (SM22) and collagen (COL1A1) were normalized to three housekeeping genes. Experiments were completed in triplicates, data presented as mean \pm SEM, significance defined as $p < 0.05$.

Results

Exposure of htHASM cells to HG or nicotine increased proliferation rates. At 5 days LG increased 15.86-fold whereas remaining exposures increased 19.66-fold (HG), 19.03-fold (LG+N) and 19.88-fold (HG+N). ($n=1$). SM22 abundance was slightly increased following exposure to HG media (1.4 ± 0.9 -fold, $p=0.07$) as was COL1A1 abundance (1.4 ± 0.1 -fold, $p < 0.05$). Furthermore, nicotine exposure slightly increased COL1A1 abundance in LG media (1.2 ± 0.1 -fold, $p=0.07$) but combined exposure to HG and nicotine did not

further increase abundance.

Conclusion

Although the effect was small, HG and nicotine modified markers of ASM phenotype. These changes could relate to changes in ASM contractility resulting from maternal environmental exposures. Further research will be needed to confirm how HG and nicotine alter cell response to TGF- β , a differentiation initiator for ASM, and if cell contractility is altered.

Theme:

Basic Science

Do you have a table/figure to upload?

No

Are you willing to participate in Goodbear's Den?

Yes

Presenter Status:

Undergraduate Students

What was your role in the project?

Perform Experiments

Authors

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