

immune-suppressive changes in surrounding E cells, which protects them against immune attack. Finally, I found that canine mammary tumors with higher proportions of qM tumor cells assemble an immune-suppressive tumor microenvironment, highlighting the translational potential of our findings. **DISCUSSION/SIGNIFICANCE OF IMPACT:** We identified that the epithelial-mesenchymal transition induces immune-suppressive changes in heterogeneous tumors. These findings may reveal novel therapeutic targets for treatment of refractory tumors. Our findings in canine tumors suggest that these mechanisms are conserved across species.

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Buffering the impact of violence exposure: The role of caregiver and peer support on adolescent brain connectivity*

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OBJECTIVES/GOALS: Adolescence is a critical period where brain networks are thought to be influenced by environmental factors. This presentation examines violence exposure's impact on brain connectivity and identifies potential protective factors. **METHODS/STUDY POPULATION:** A secondary data analysis was conducted using data from a subsample of the Adolescent Brain Cognitive Development Study (release 5.1). Youth who completed victimization questionnaires at two time points were eligible for inclusion, resulting in 2016 participants. Linear regression was utilized to analyze associations between violence exposure measured by the juvenile victimization questionnaire and functional connectivity of specified regions of interests using the Gordon functional parcellation for cortical regions and the Freesurfer parcellation for subcortical regions. Moderation analysis will be utilized to assess the effects of peer and caregiver support on the associations between violence exposure and functional connectivity, currently ongoing. **RESULTS/ANTICIPATED RESULTS:** Between 18 and 59% of the sample reported experiencing at least one form of violence exposure, with racial differences noted in missing versus complete data. Multiple domains of violence and cumulative exposure were associated with both increased and decreased functional connectivity across within-network, between-network, and network-subcortical regions. At baseline, internet violence was linked to lower within-network connectivity, while peer victimization was associated with higher connectivity at both baseline and follow-up. Between network analysis showed lower connectivity with witnessing violence at baseline and higher connectivity with internet victimization at follow-up. **DISCUSSION/SIGNIFICANCE OF IMPACT:** These findings emphasize the need for further exploration of the underlying mechanisms that link violence exposure to developmental trajectories and identification of protective factors such as caregiver and peer support, to inform interventions and promote resilience in affected youth.

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The diffusion of vaginal bacterial extracellular vesicles through cervicovaginal mucus facilitates inflammation in female reproductive tract cells

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OBJECTIVES/GOALS: To probe microbe and bacterial extracellular vesicle (bEV) mobility through biological barriers, we use novel multiple-particle tracking technology. The goal is to evaluate changes caused by extracellular vesicles relevant to placental function and neonatal development. **METHODS/STUDY POPULATION:** We conducted multiple particle tracking to assess whole bacterial and bEV mobility in cervicovaginal mucus. To accomplish this, cervicovaginal mucus was self-collected from 10 women. Mucus samples were characterized via wet mount, Nugent score, and pH measurements. In parallel, we cultured commercially available vaginal bacteria strains in anaerobic conditions. We isolated bEVs via ultracentrifugation, and subsequently characterized them via nanoparticle tracking analysis to measure size, ζ -potential, and concentration. We investigated reproductive tract tissues response to bEVs. We dosed vaginal, endometrial, myometrial, and placental cells lines with bEVs over a 24 h period and determined uptake, viability, and cytokine production. One-way analysis of variance was used for statistical analysis. **RESULTS/ANTICIPATED RESULTS:** Based on our previous work, size and ζ -potential greatly affect particle mobility in mucus. *G. vaginalis* and *M. mulieris* were smaller than *L. crispatus* and *L. iners*. *G. vaginalis* had a more net-neutral ζ -potential compared to other bEVs. During multiple-particle tracking analysis, whole bacteria were unable to diffuse through vaginal mucus, while bEVs showed increased mobility. Through fluorescence levels, we determined *M. mulieris* bEVs reach >90% uptake at 24 h. Uptake was verified via microscopy. Across all strains, bEVs were not detrimental to placental viability. When investigating cytokine production in placental cells, an increase in IL-6 was seen after treatment with *L. iners* bEVs, while TNF α was increased after treatment with *G. vaginalis* bEVs. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Vaginal microbiome dysbiosis increases adverse obstetric indications. We demonstrate that bacteria are unable to ascend to reproductive tissues. We propose that bEVs travel through vaginal mucus, facilitating microbe-host communication. This impacts obstetric disease pathology and is relevant for diagnostic criteria during pregnancy.

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CD8+ T-cell transfer induces adverse alterations to the post-myocardial infarction scar*

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OBJECTIVES/GOALS: Cardiovascular disease, particularly myocardial infarction (MI), is a leading cause of death in the USA. Previous studies have identified CD8+ T-cells as adverse regulators post-MI. We hypothesized that CD8+ T-cells impair cardiac function by altering scar composition. **METHODS/STUDY POPULATION:** MI was