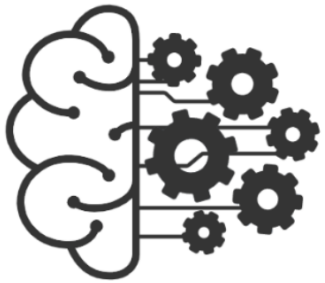
Long-term effects of prenatal alcohol exposure on health and immune function



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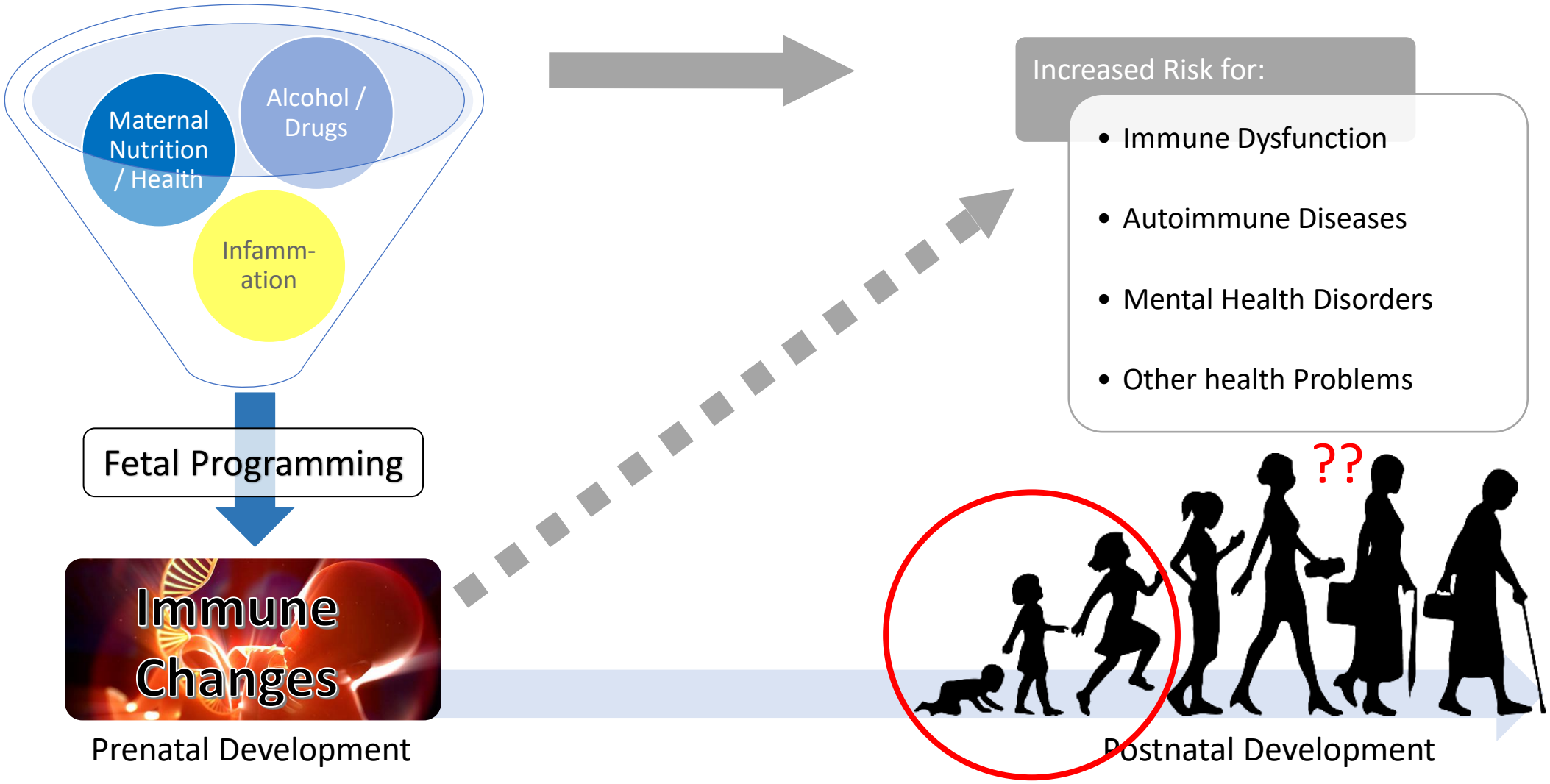
June 26, 2022

Disclosure:

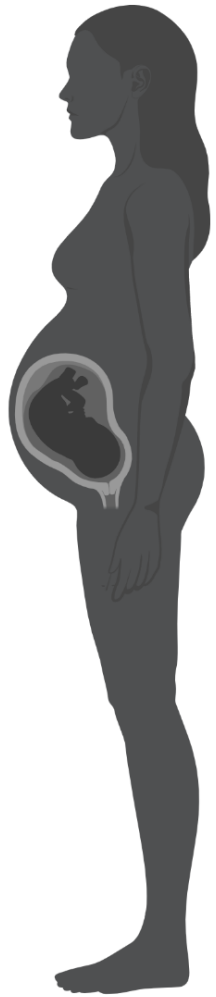
I have nothing to disclose

Developmental Origins of Health and Disease (DOHaD)



Evaluation of the impact of alcohol consumption on the maternal immune profile

- Collaboration with Dr. Tina Chambers
- Ukraine: Mothers recruited during pregnancy: alcohol-consuming and low/no alcohol-consuming
- Blood samples collected:
  - Mothers: 2nd & 3rd trimesters of pregnancy
  - Children: 2 – 3.5 years old
- Assessment of child neurodevelopment
- Measurement of cytokine levels

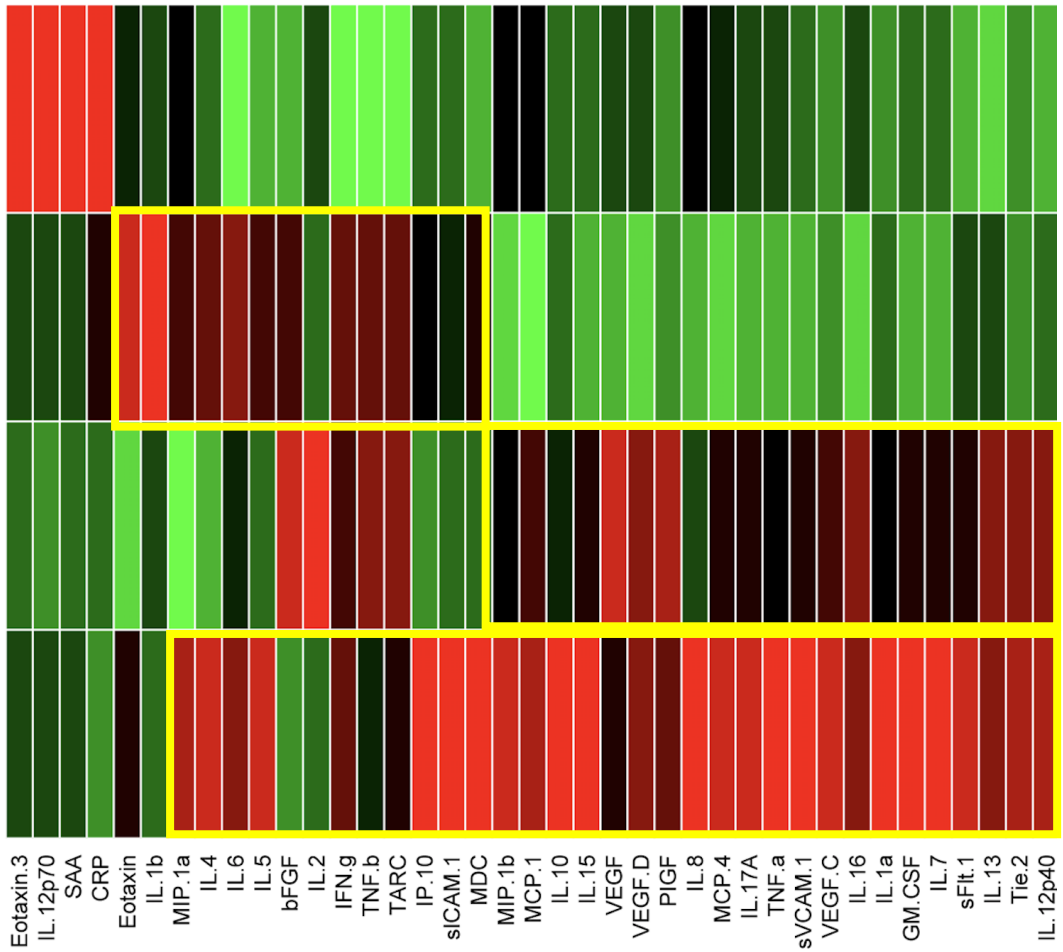


Bodnar *et al.*, Brain, Behavior, and Immunity (2018)

Bodnar *et al.*, Journal of Neuroinflammation (2020)

Overall cytokine profiles

Second Trimester



Low/no alcohol-consumption; typical neurodevelopment (n = 60)

Low/no alcohol-consumption; neurodevelopmental delay (n = 35)

Alcohol-consumption; typical neurodevelopment (n = 22)

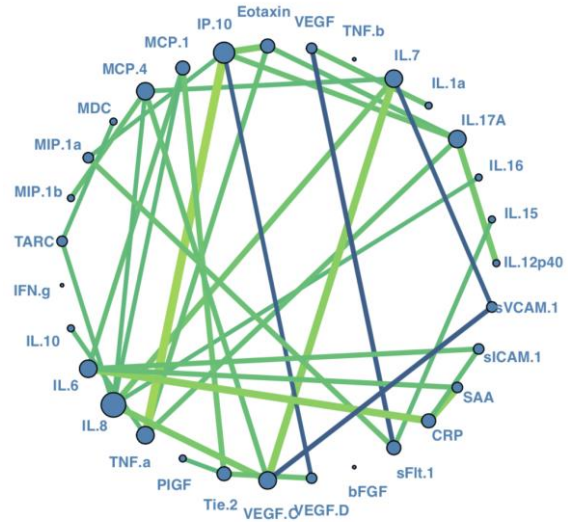
Alcohol-consumption; neurodevelopmental delay (n = 35)

Bodnar *et al.*, Brain, Behavior, and Immunity (2018)

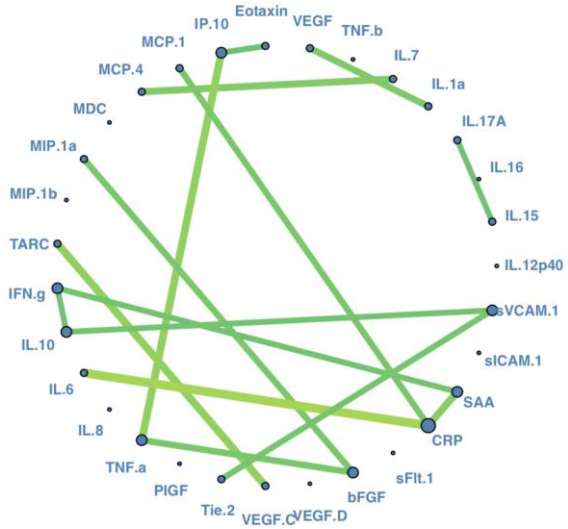
Maternal cytokine connectivity models

Low/no exposure

Typical neurodevelopment



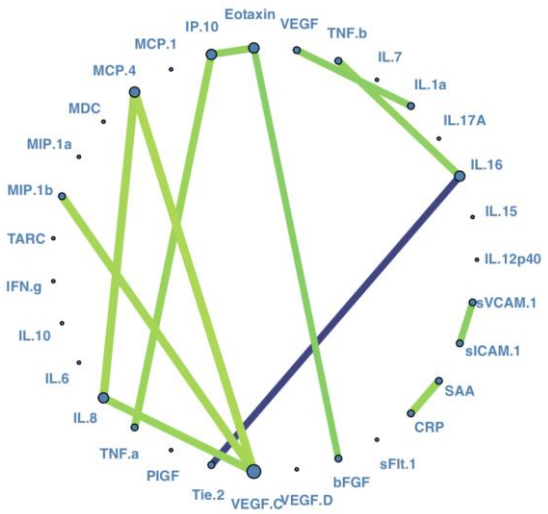
Neurodevelopmental delays



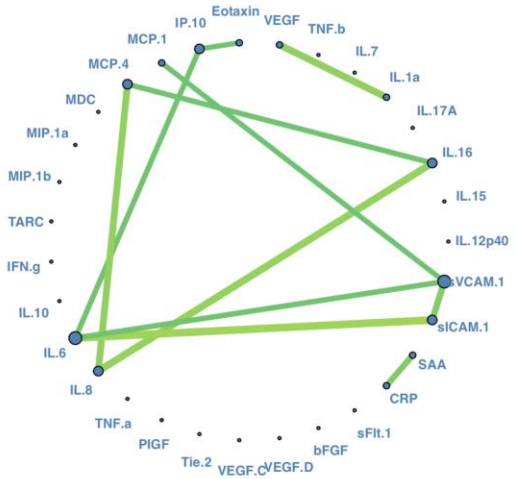
p's < 0.001

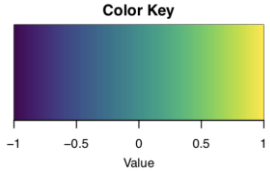
Alcohol exposure

Typical neurodevelopment

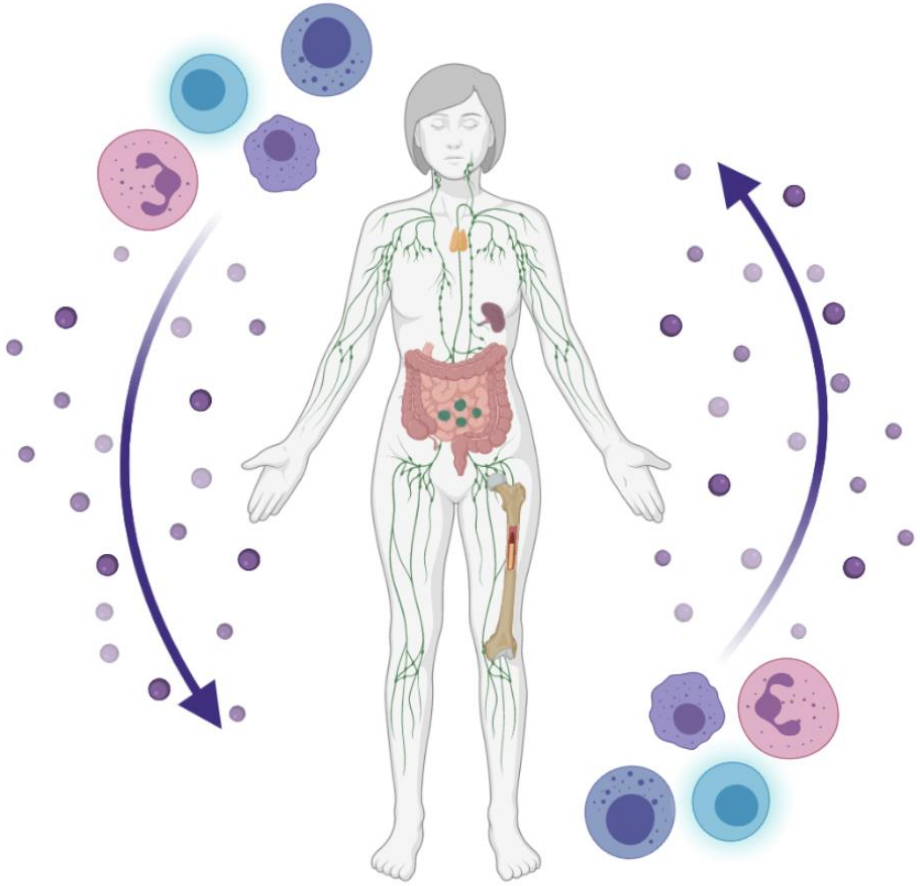


Neurodevelopmental delays

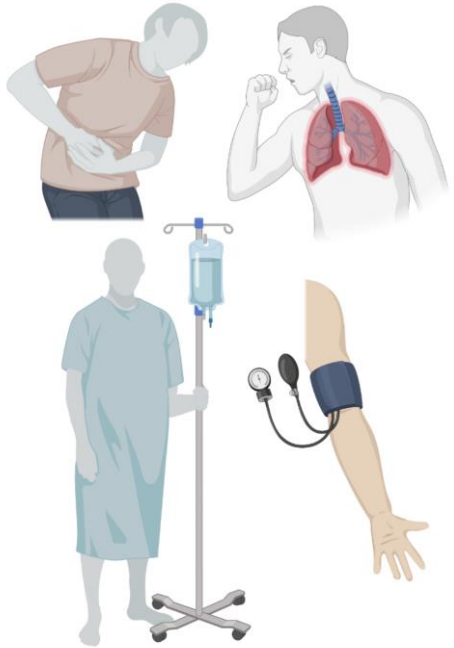




Extending into adulthood



Low grade lifelong inflammation



Physical health problems

Mental health problems



ADULT HEALTH STUDY

Recruiting a cohort of adults with FASD (22 years old+) and unexposed adults.

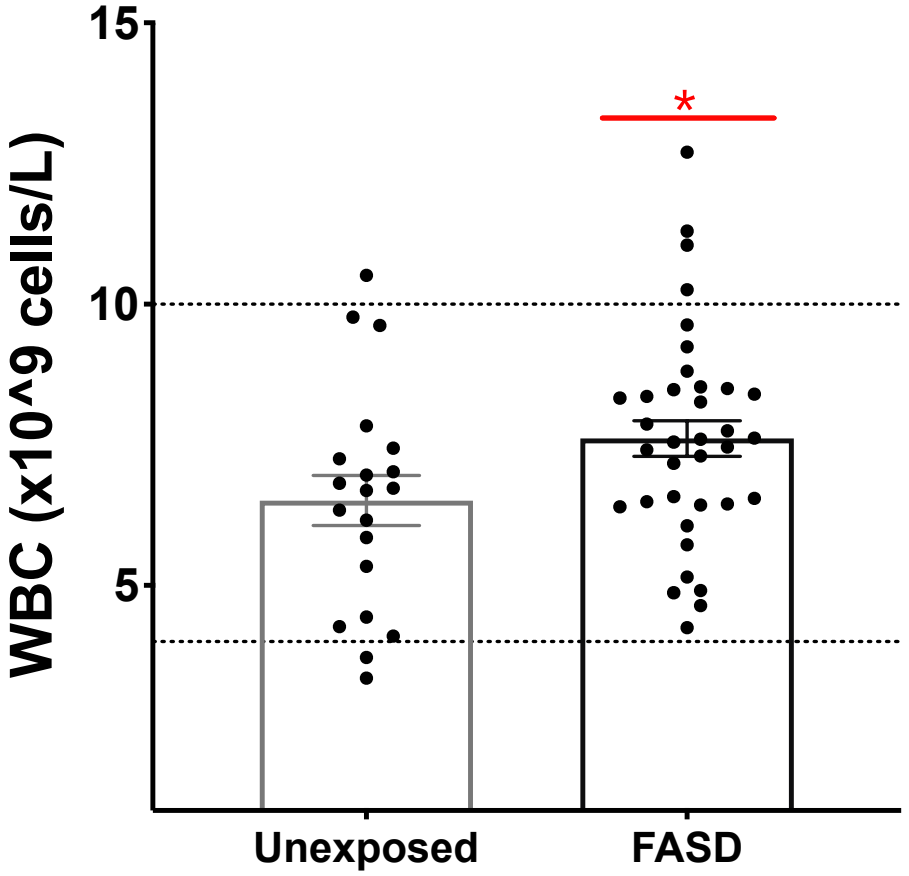
- Adults with FASD
- Unexposed adults

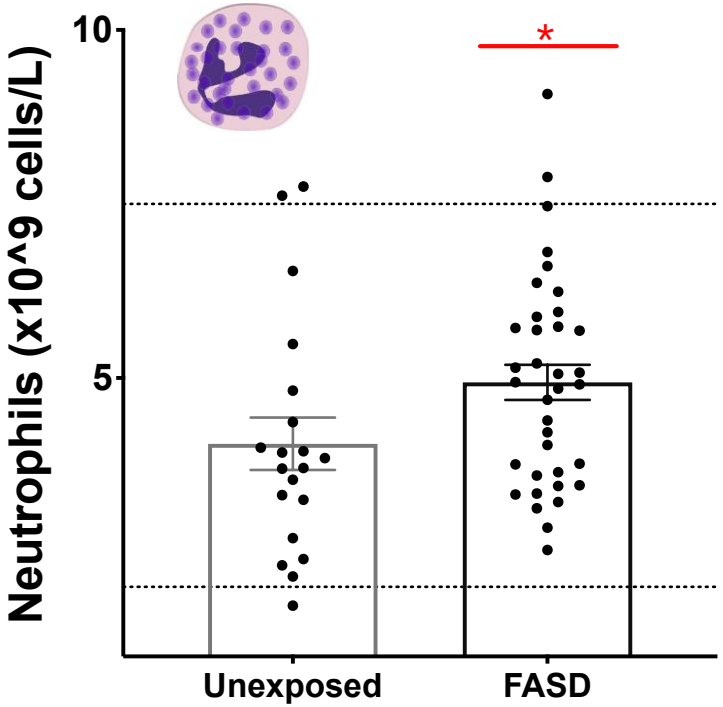
- ❑ Demographic questionnaires
- ❑ Health surveys
- ❑ Mental health inventories (BDI, BAI)
- ❑ Stress questionnaires (PSS, PSW)

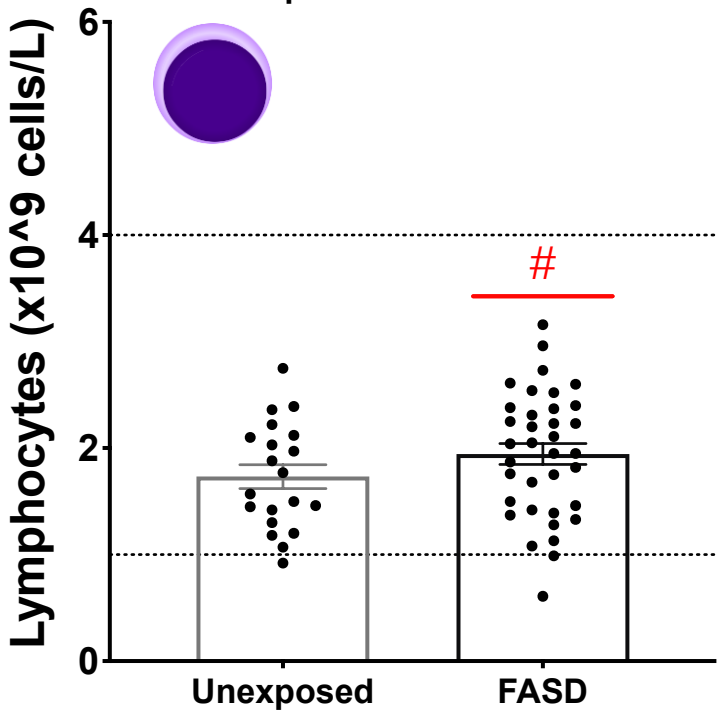
- ❑ NIH toolbox items (assessing attention, cognition, memory)


- ❑ Complete blood count (CBC)
- ❑ Customized cytokine panels
- ❑ Erythrocyte sedimentation rate (ESR)
- ❑ Health measures: Height, weight, blood pressure, temperature
- ❑ Medical records

Immune cell counts (CBC)



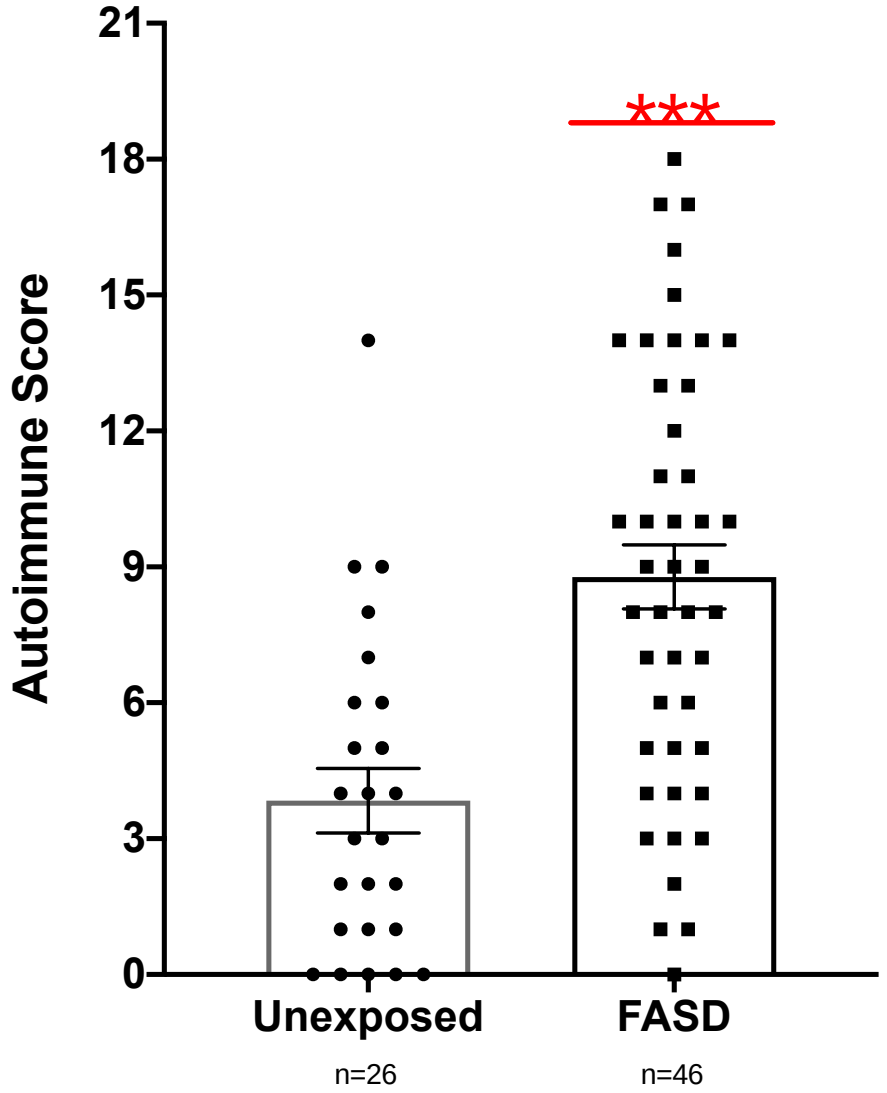


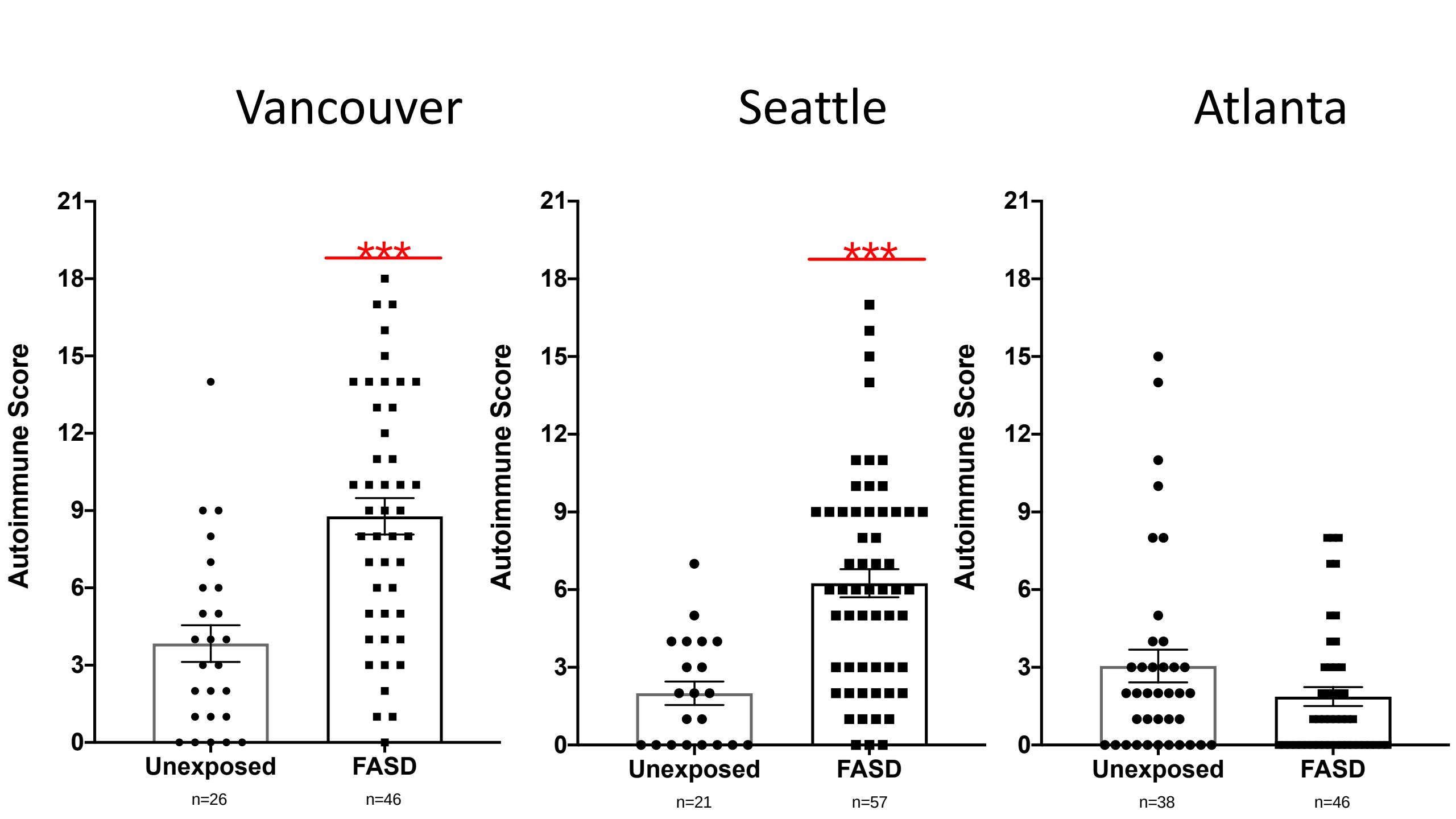


Pre-clinical symptoms of early autoimmune disease

Have you experienced any of the following symptoms:

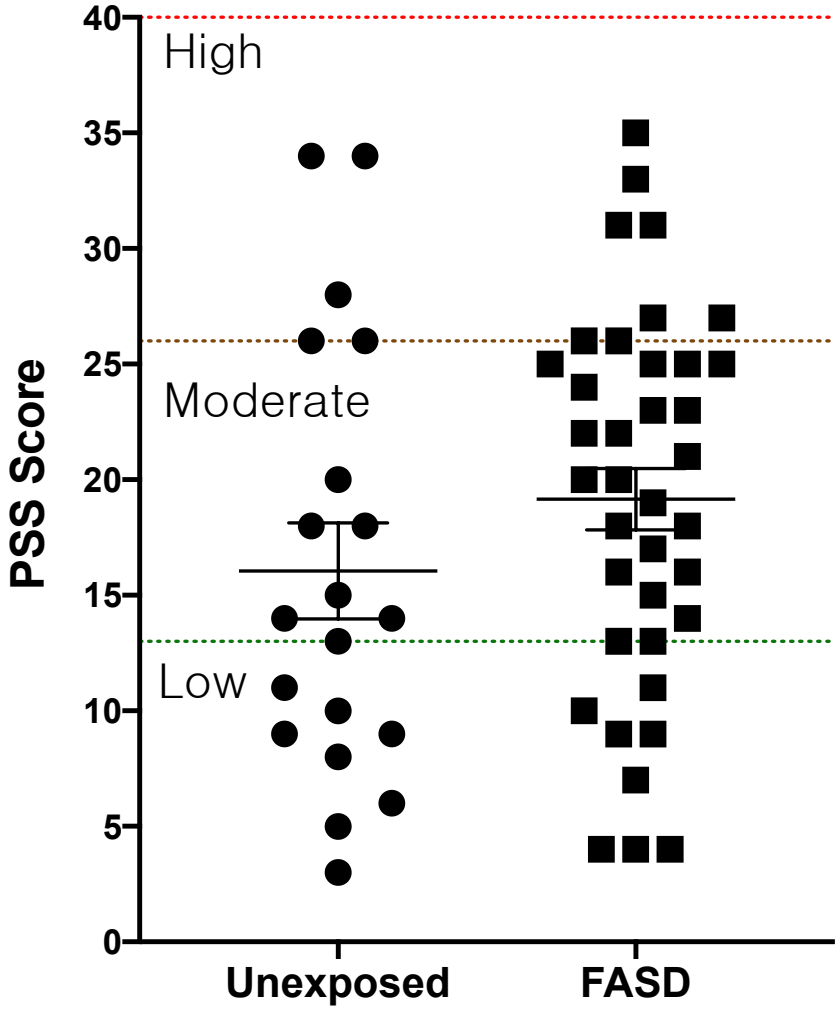
3. Alopecia (loss of hair on the top of the head)	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
4. Unexplained skin rashes	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
5. Skin that bruises easily	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
6. Unexplained lack of energy	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
7. Persistent fever or night sweats	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
8. Dry mouth	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer
9. Pain and/or tenderness throughout the body	◯ Yes ◯ No ◯ Don't know/Not sure ◯ Prefer not to answer



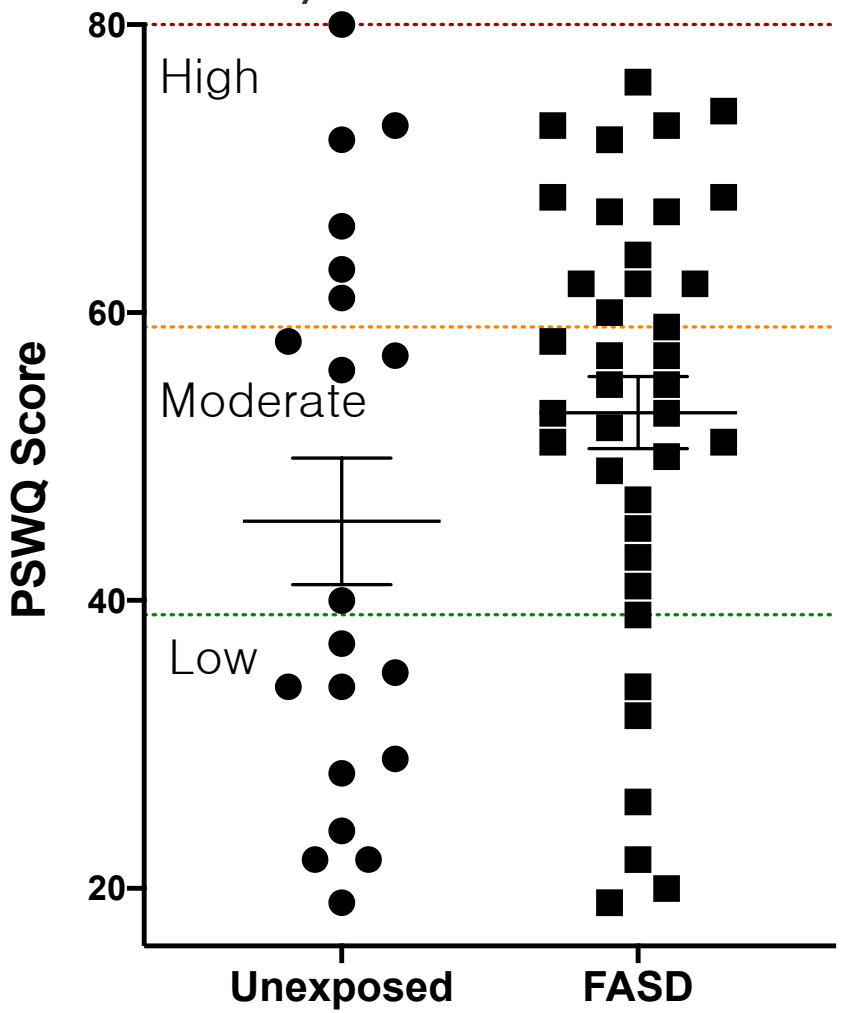

Vancouver
Seattle
Atlanta
Autoimmune Score
21
18
15
12
9
6
3
0
***
***
Unexposed
FASD
n=26
n=46
n=21
n=57
n=38
n=46

Stress assessments

Perceived Stress Score

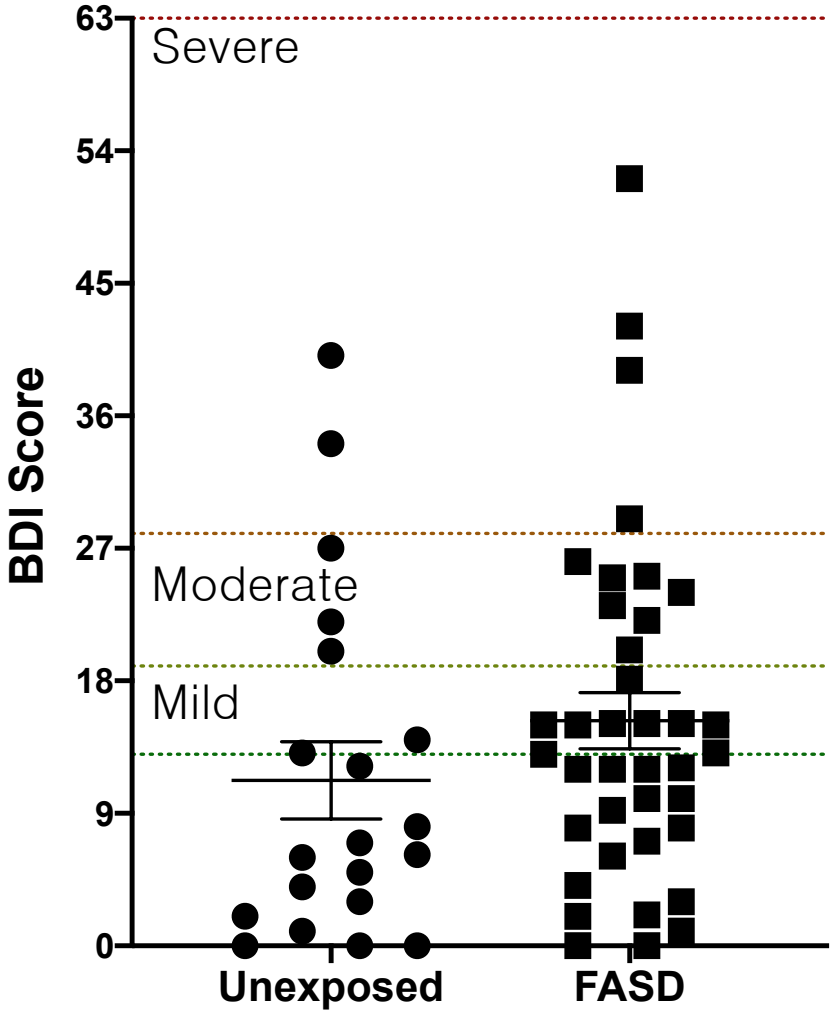


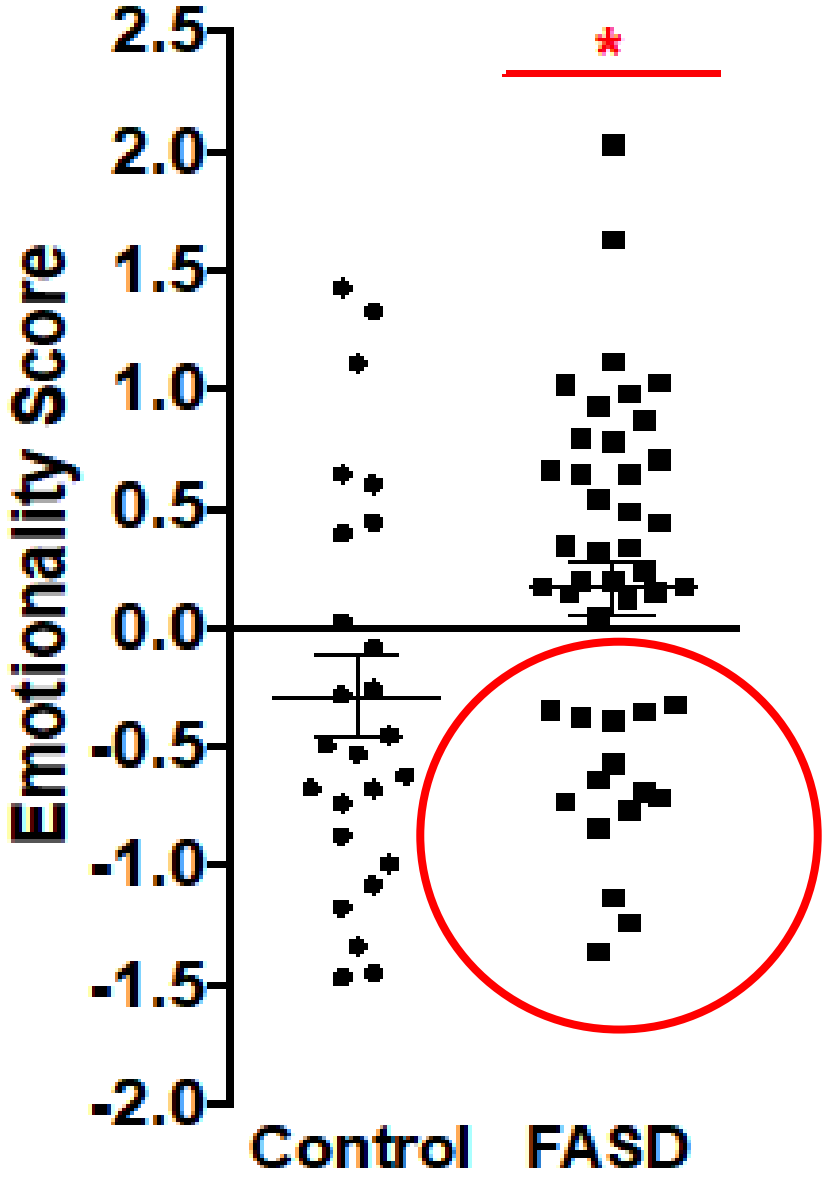
PS Worry Questionnaire



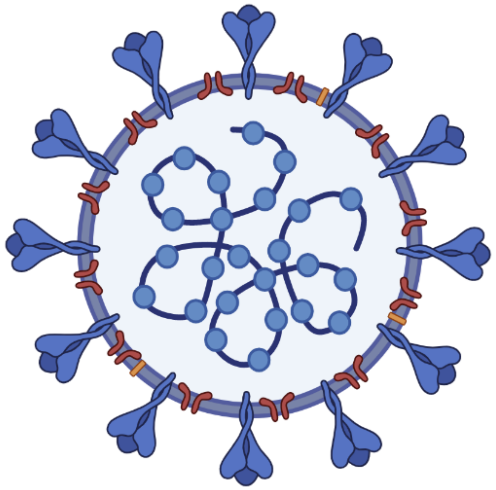
Mental health assessments

Depression Inventory

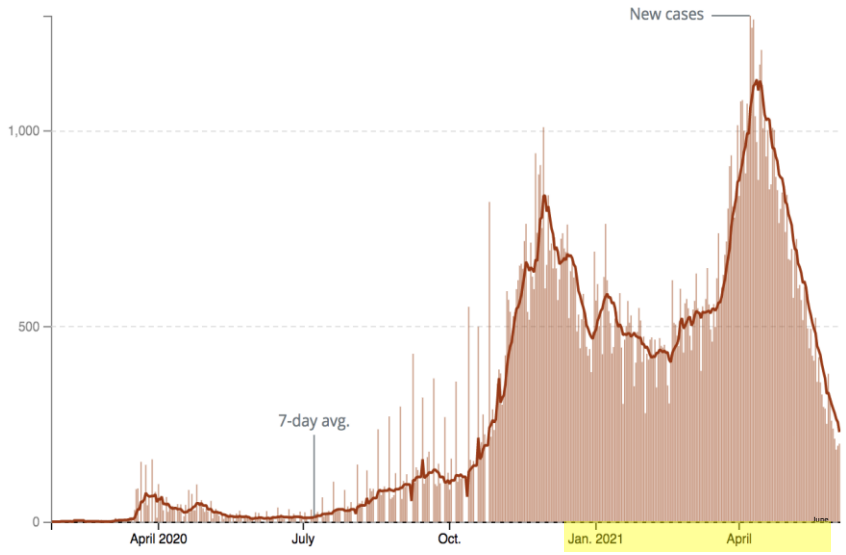


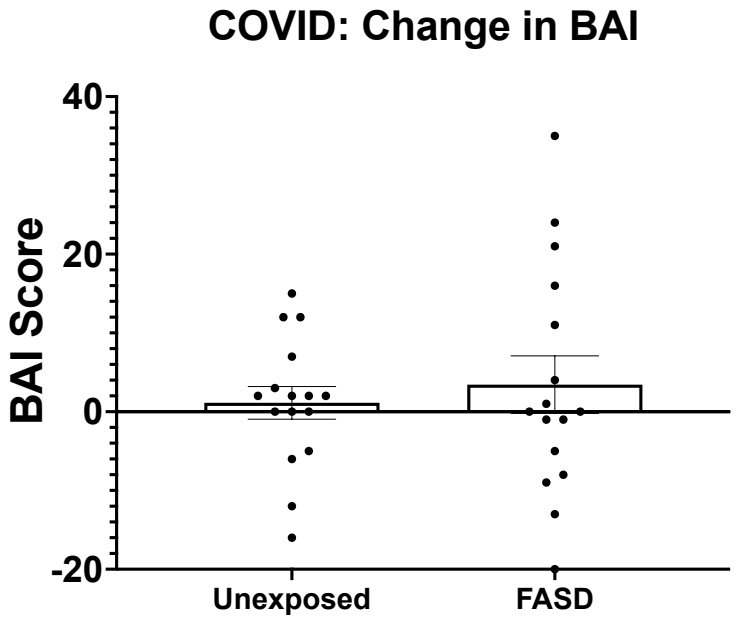


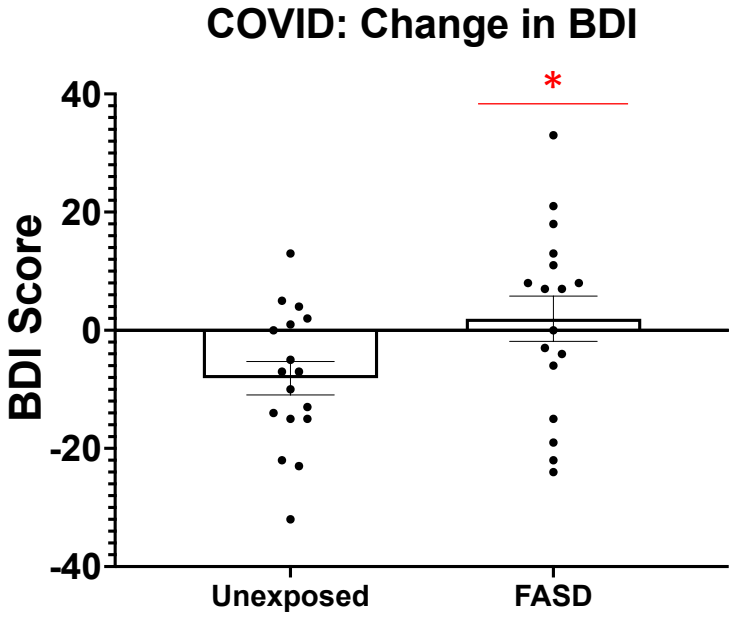
Mental health assessments during COVID-19



COVID-19 Case Rate in BC[1]







Summary and future directions

- Adults with FASD show:
  - Increased immune cell counts
  - Elevated pre-clinical autoimmune score
  - Increased levels of anxiety
  - Increased rates of depression during the COVID-19 pandemic
- Ongoing work is examining levels of inflammatory proteins to explore risk vs. resilience to mental health problems in adults with FASD.

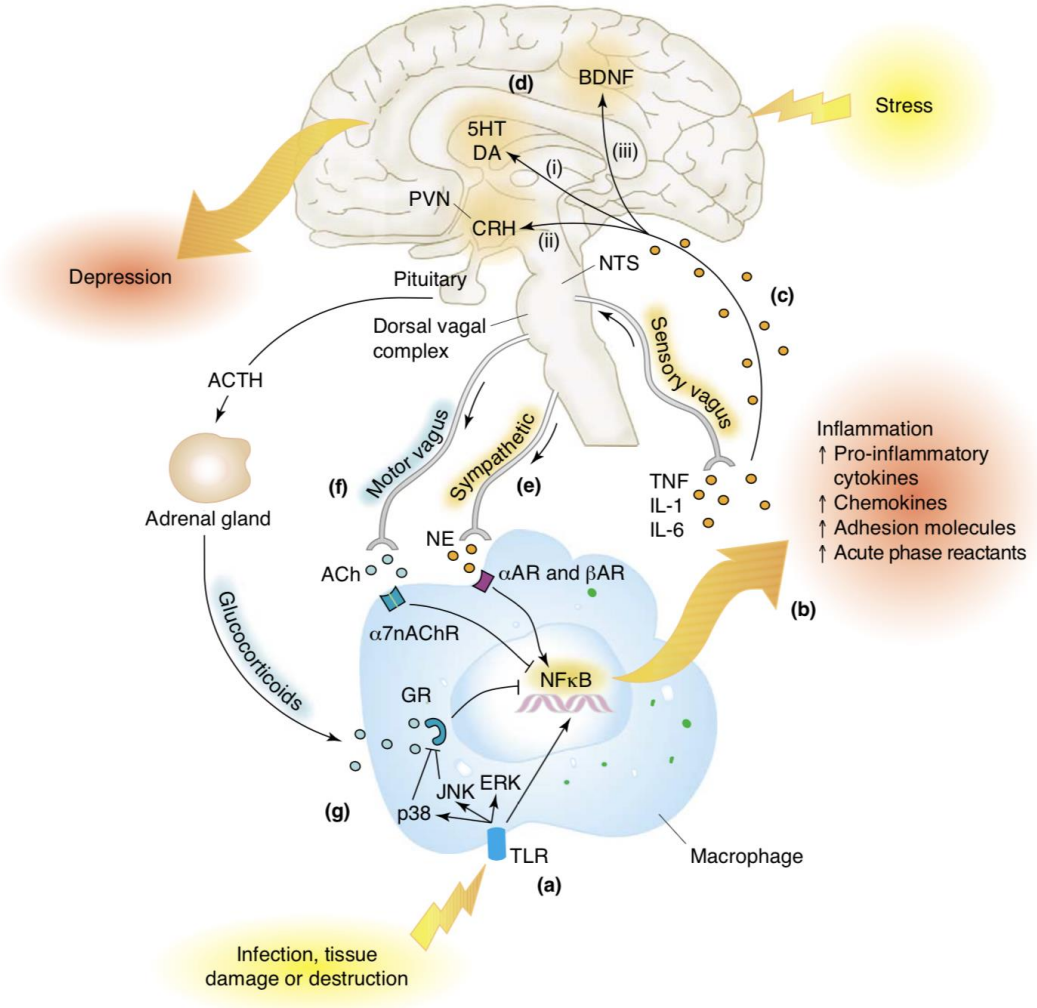


Figure: Raison, Capuron, Miller (2006)

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Questions?