Anti-Bacterial Effects on Ocular Surface Pathology in Dry Eye Disease

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Background

- Dry eye disease (DED) is a common ocular surface inflammatory disease affecting > 10 million people in the world
- Immunological mechanisms also play an important role in regulating the ocular surface environment in DED
  Anti-inflammatory: Regulatory T cells (Tregs)
  Pro-inflammatory: Th1 (IFN-γ) and Th17 cells induced in inflammation condition of DED
- The ocular surface is continually exposed to the environment and as a result, exposed to different types of microbes. Depending on the bacterial species, either regulatory or effector T cell responses can be generated

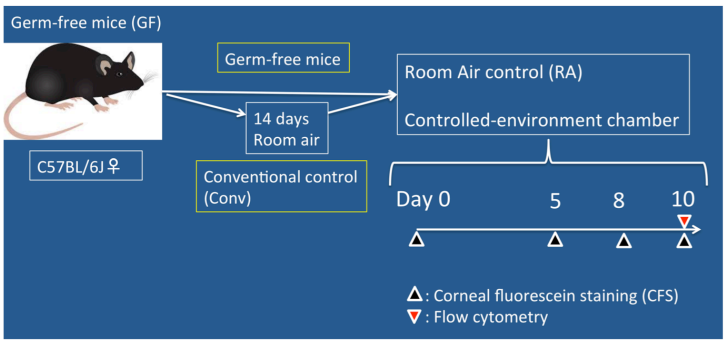
However, the immunological behaviors of commensals and pathogens in ocular surface are still not clear

Purpose

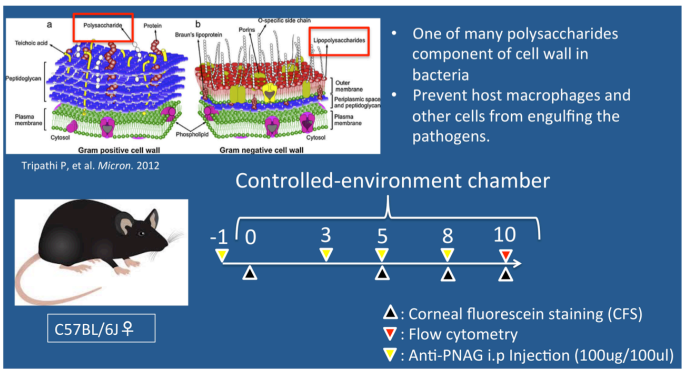
To investigate local and systemic effects on immunity and the commensal bacteria on the ocular surface in murine dry eye disease (DED) model

Methods

Exp.1 Germ free mice



Exp.2 anti-polysaccharide matrix polymer poly-*N*-acetyl glucosamine (Anti-PNAG)



Results

Fig 1. CFS was worsened and Treg was reduced in DED-GF

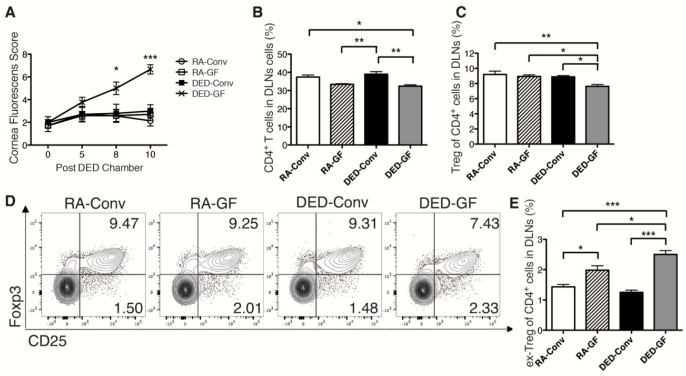


Fig 2. Increased IFN-γ- and IL-17-producing T cells in DED-GF

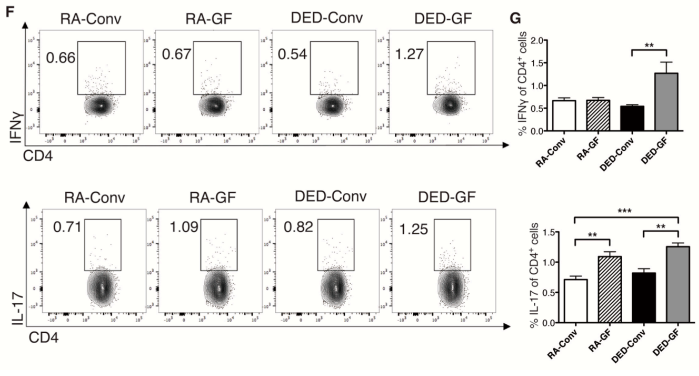


Fig 3. DED with anti-PNAG recovered their CFS

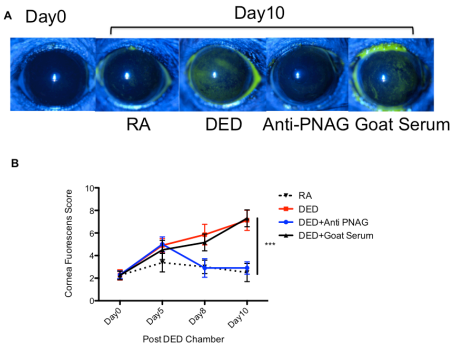


Fig 4. Anti-PNAG injection increased the frequencies of Tregs

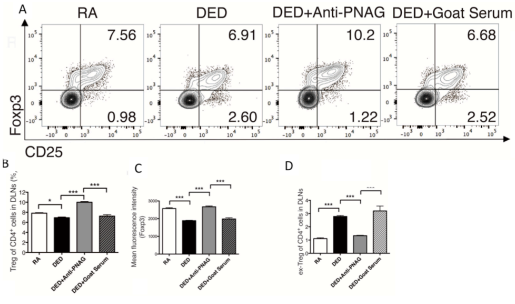
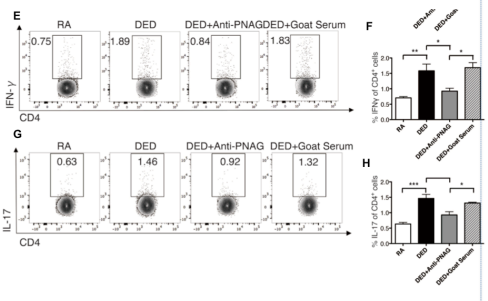


Fig 5. Anti-PNAG injection decreased IFN-γ- and IL-17-producing T cells in DED



Conclusion

Our data suggest commensal bacteria influences local tolerance mechanism in DED

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