

Preventing postpartum uterine disease in dairy cattle depends on avoiding, tolerating and resisting pathogenic bacteria

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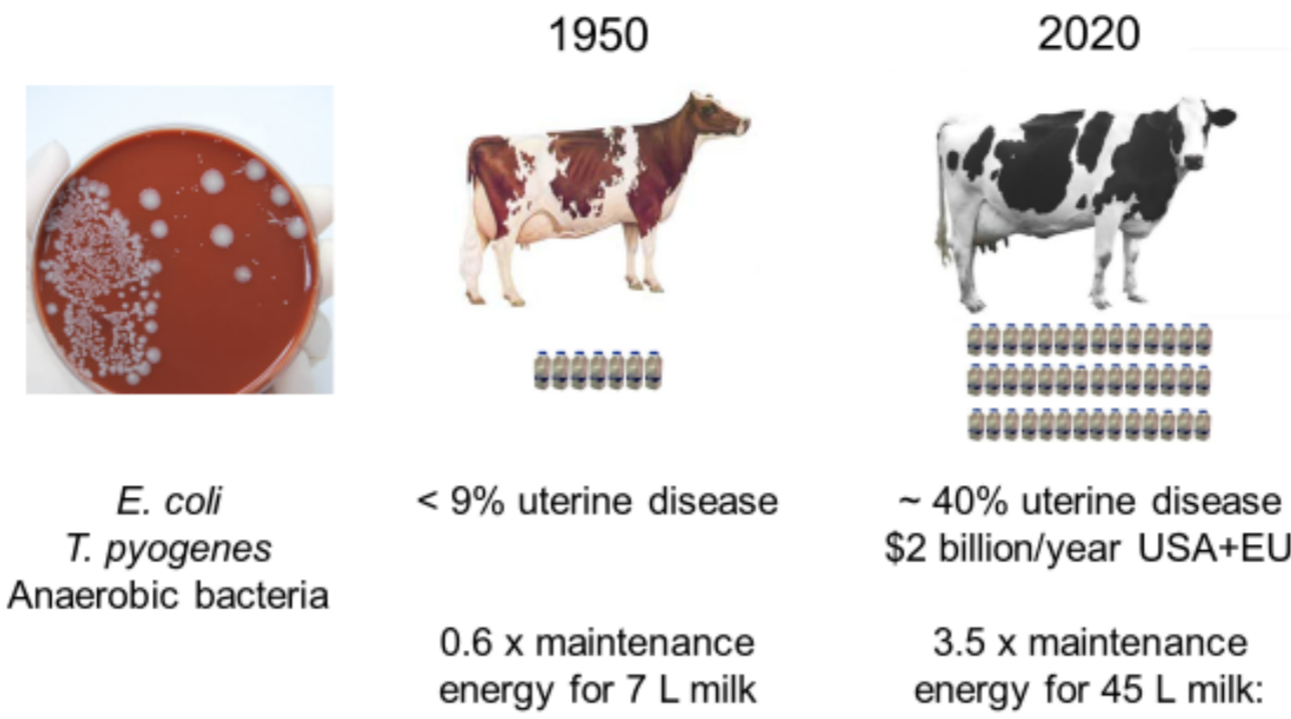


DCRC 2020

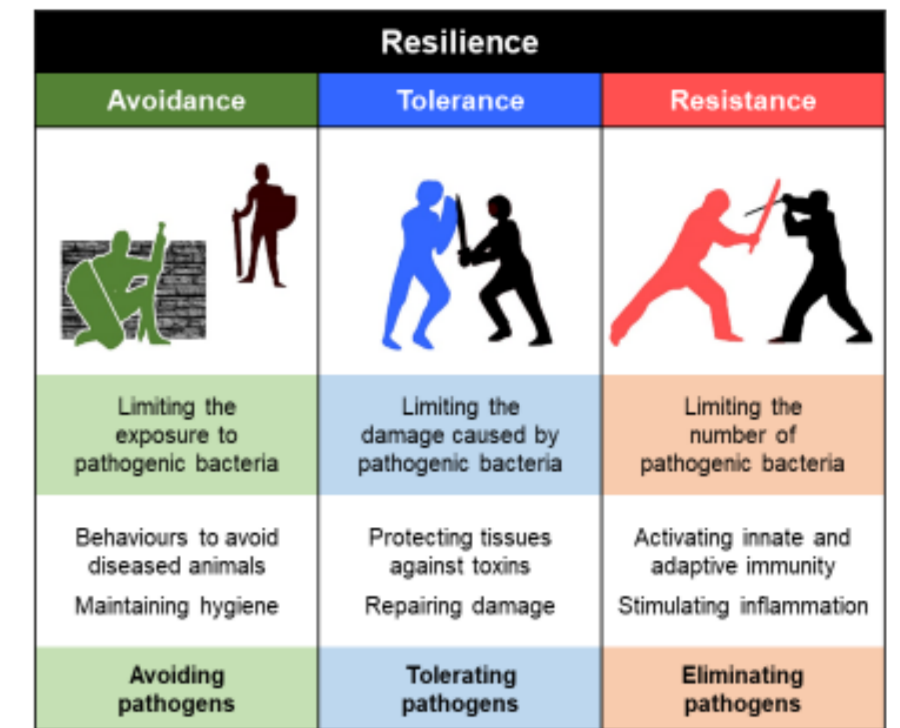
Swansea University Medical School



The uterus is exposed to multiple pathogenic bacteria, but uterine disease is a problem of modern dairy cattle

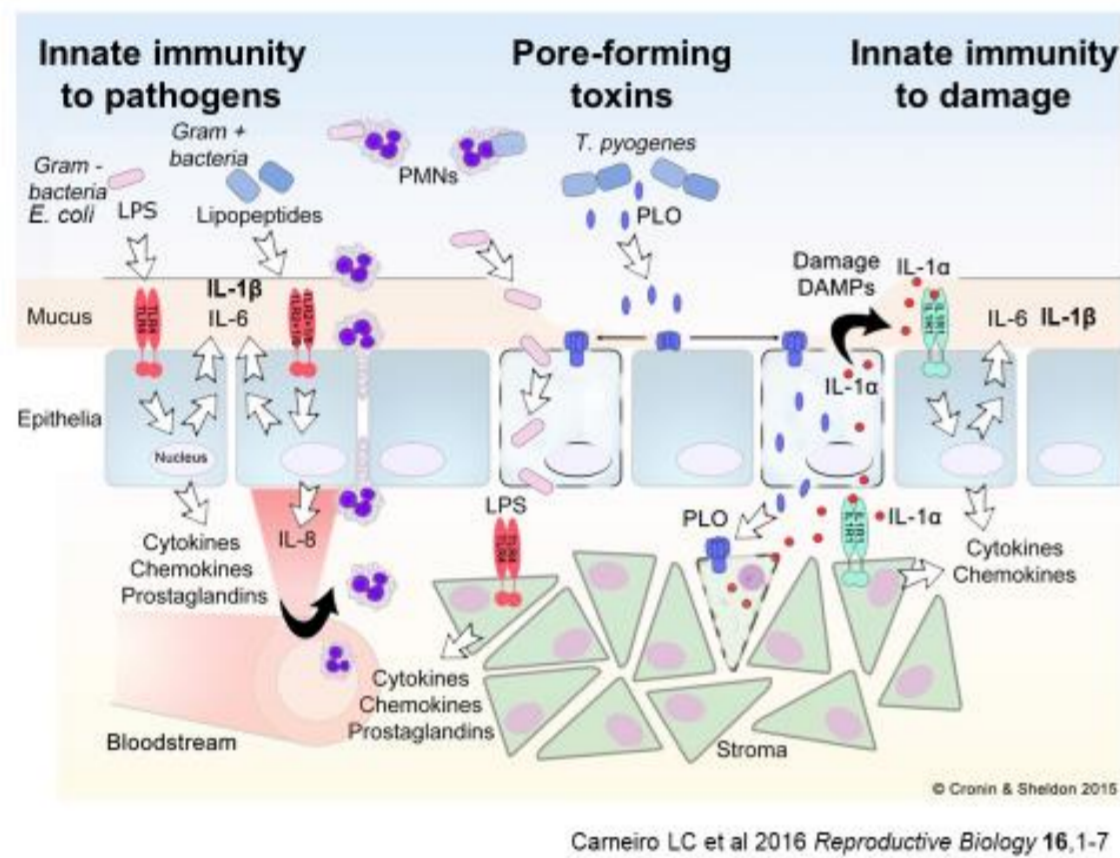


Resilient cows prevent uterine disease developing by avoiding, tolerating and resisting pathogenic bacteria



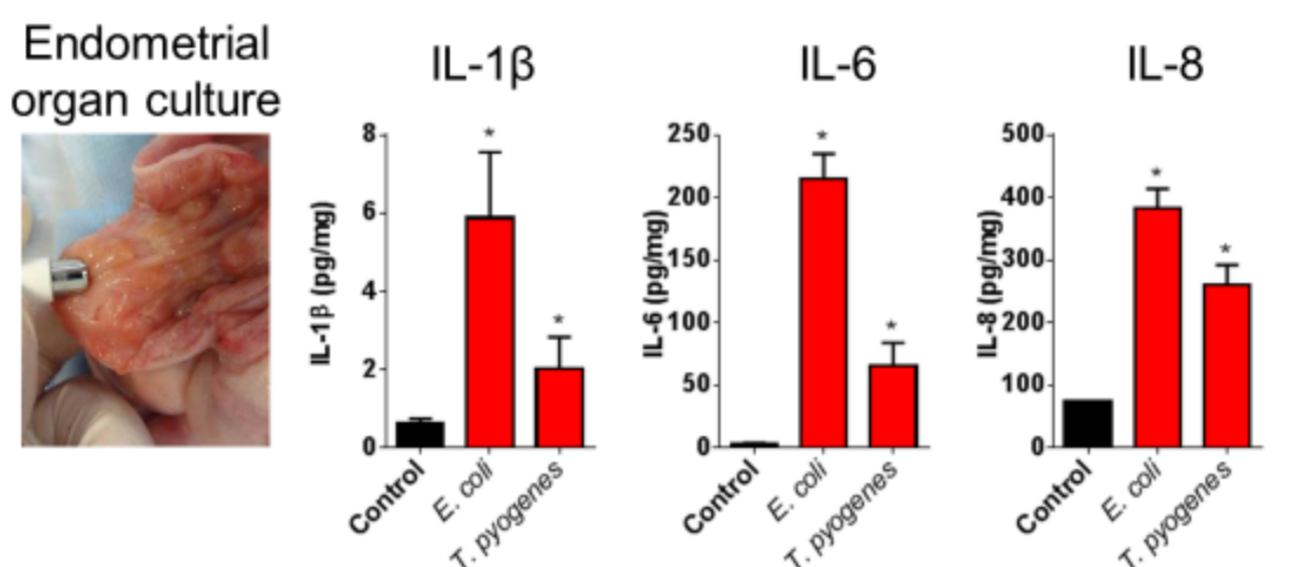
Sheldon et al 2020 Theriogenology 150, 158-165

Whether animals develop uterine disease depends on their resistance and tolerance to pathogens



Carreiro LC et al 2016 Reproductive Biology 16, 1-7

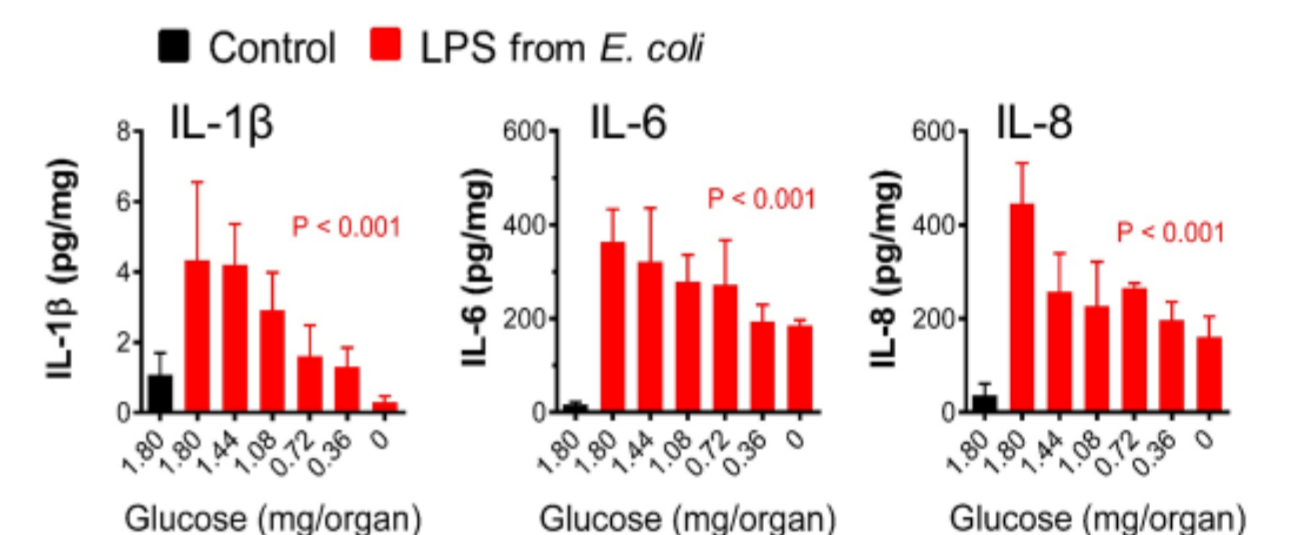
Resistance – uterine endometrial organ culture inflammatory responses to pathogenic bacteria



Data are mean (SEM), ANOVA, * P < 0.05 vs. control

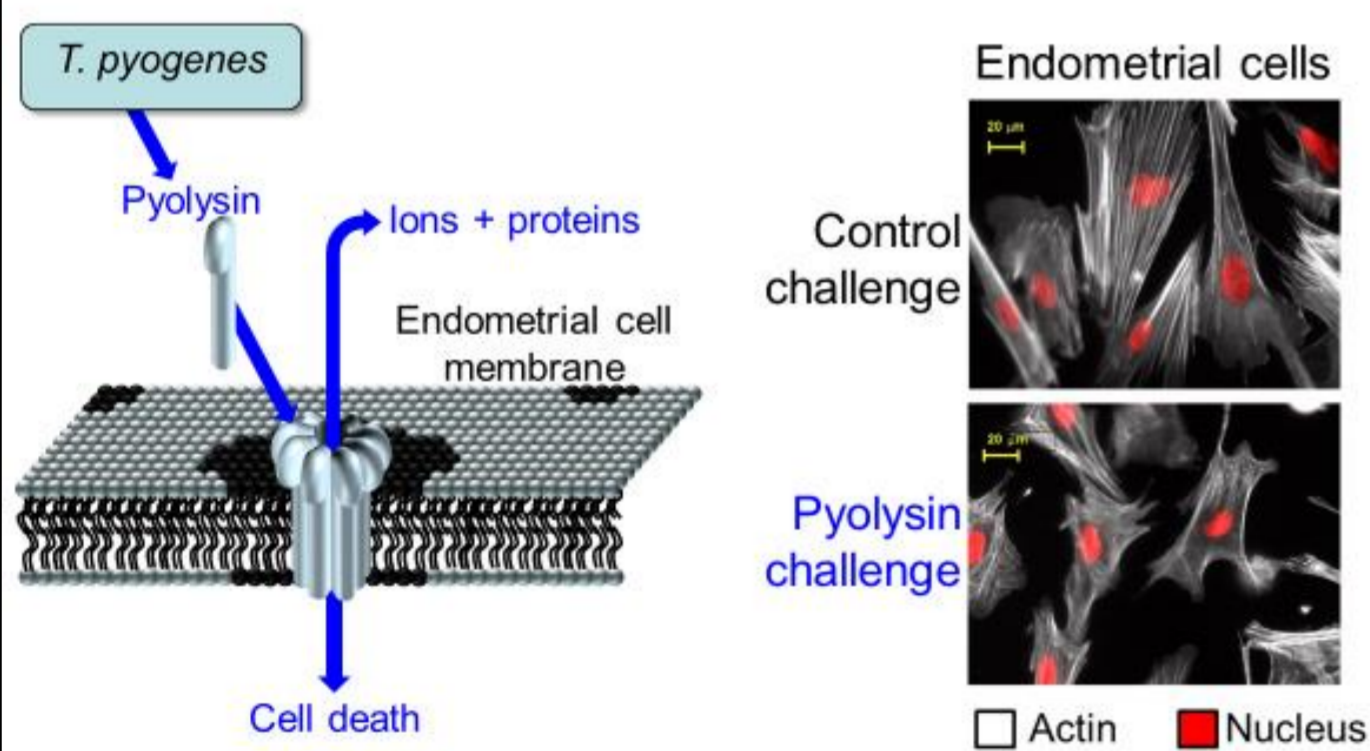
Borges et al 2012 AJR 67: 526

Reducing the availability of glucose compromises resistance and the uterine inflammatory response



Turner et al 2016 PLoS ONE 11: e0151416

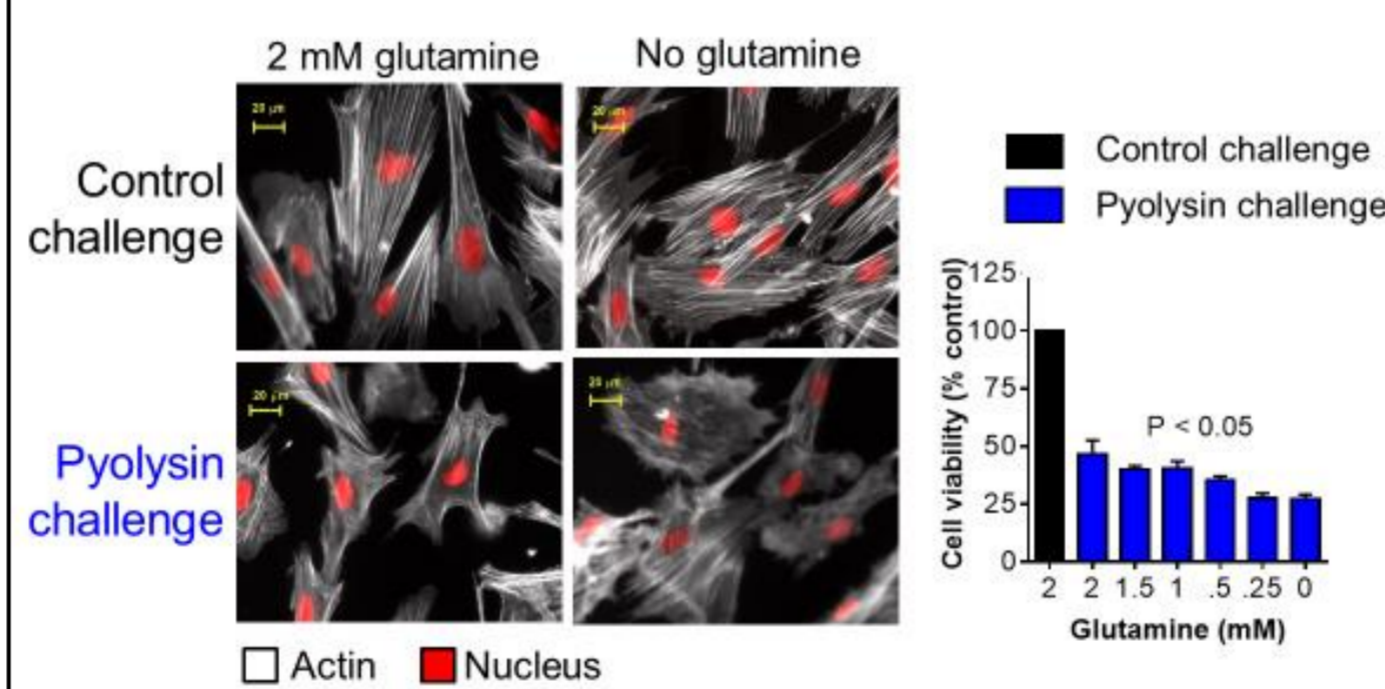
Tolerance – *T. pyogenes* secretes a pore-forming toxin, pyolysin, which damages and kills endometrial cells



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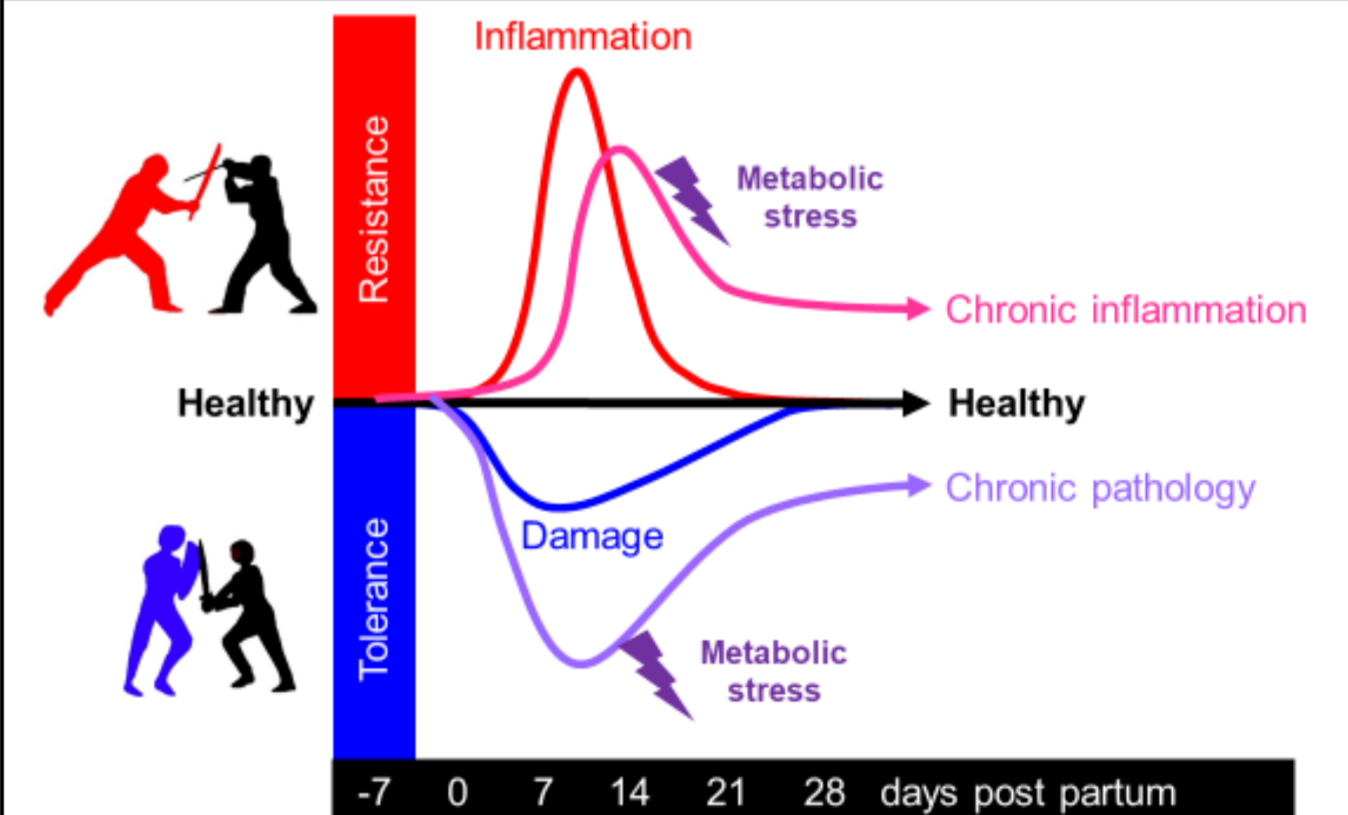
Turner et al 2020 PLoS ONE 15, e0219275

Reducing the availability of glutamine compromises endometrial cell tolerance to pore-forming toxins

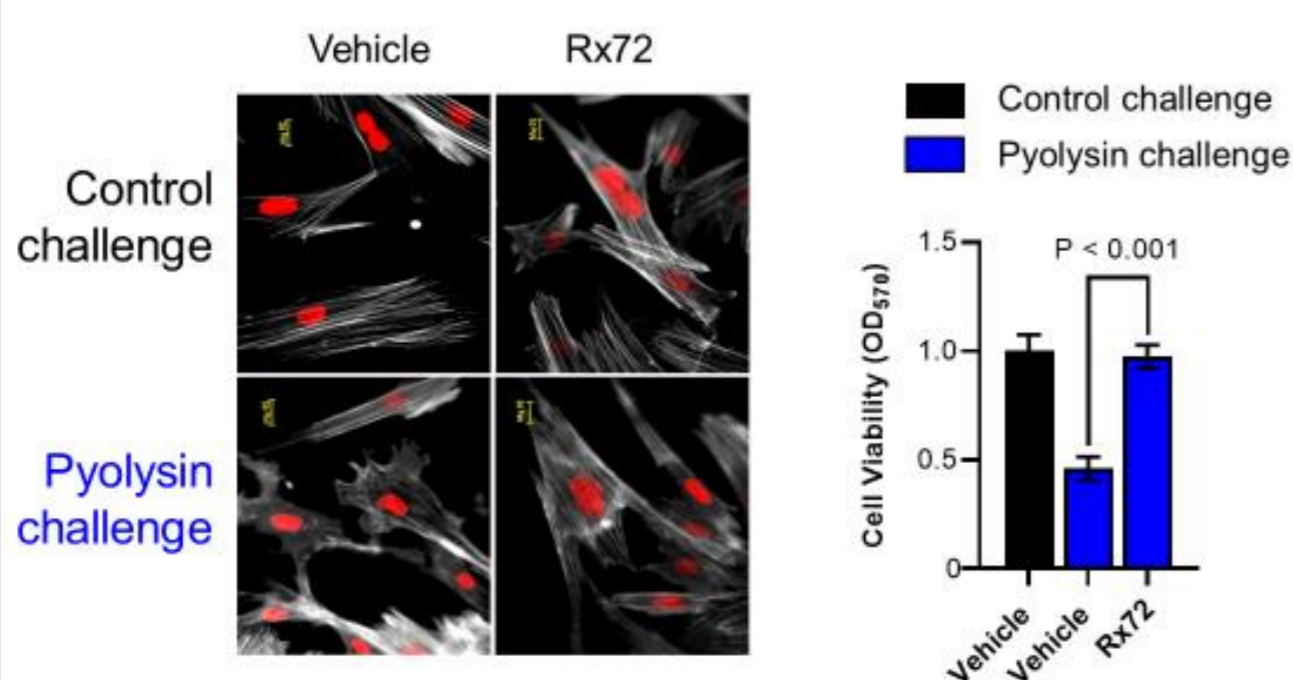


Turner et al 2020 PLoS ONE 15, e0219275

Compromised resistance or tolerance to pathogens causes postpartum disease



Treatments can increase endometrial cell tolerance to pore-forming toxins



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Take-home messages

The postpartum uterus is always exposed to multiple pathogenic bacteria
Resilient cows prevent uterine disease developing by avoiding, tolerating and resisting pathogenic bacteria
Metabolic deficits compromises resistance and tolerance to pathogenic bacteria in the uterus
New treatments to enhance the ability of animals to tolerate and resist pathogens, and controlling metabolic stresses that impair resistance and tolerance, will help prevent uterine disease, and reduce the use of antibiotics.

Sheldon et al 2019 Ann Rev Anim Biosci, 7:361-384