Encounters with oxygen: Aerobic physiology and H₂O₂ production of Lactobacillus johnsonii

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Propositions belonging to the thesis: “Encounters with oxygen. Aerobic physiology and H₂O₂ production of *Lactobacillus johnsonii*”

1. In *Lactobacillus johnsonii*, the activities of NADH flavin reductase and NADH oxidase are both the main cause of oxidative stress and the main requirement for aerotolerance. 
   - chapter 2 and 3 of this thesis
2. The main purpose of hydrogen peroxide production by *L. johnsonii* is oxygen scavenging, which prevents damage by other reactive oxygen species, such as superoxide, while reducing NADH expenditure compared to the water producing alternative. 
   - chapter 6 of this thesis
3. Bacterially produced hydrogen peroxide in mammalian host organisms reaches its highest levels shortly after birth, when oxygen levels are high and H₂O₂-producing lactobacilli are plentiful. 
   - chapter 6 of this thesis, [Espey MG (2013)]
4. Pyrimidine production is the main CO₂ requiring pathway in *L. johnsonii*; emptying pyrimidine pools are the main cause of cell death after CO₂ depletion, comparable to thymineless death. 
   - chapter 5 of this thesis
5. Species belonging to the *Lactobacillus acidophilus* group are the ultimate freeloaders: they require their neighbors and hosts to provide all cellular building blocks and to express catalase to clean up after them.
6. The fact that species with so many metabolically incapacities as the ones belonging to the *L. acidophilus* group, manage to be the most prevalent constituents of the vaginal microbiota, shows that we are only starting to understand what traits render bacteria resilient in host-associated environments.
7. If *L. johnsonii* would organize an International Panel on Climate Change, it would applaud the rising CO₂ levels and acidification of the earth’s water supplies; it would regret the everlasting high-oxygen levels in the atmosphere.
8. Even in case bifidobacteria and lactobacilli sold as probiotics do not convincingly impact the health of already healthy consumers, they have played a decisive role in raising public awareness of the current scientific paradigm shift of anti- to probiotic.
9. Most columns in newspapers raise more questions than they provide answers. This also holds true for the vast majority of PhD theses.
10. No person can call himself a true intellectual without basic knowledge on the chemistry of life.

Rosanne Hertzberger, Amsterdam May 2014.