**The Enigma of the Anelloviridae**

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BIOC0021: Advanced Investigative Project in Molecular Biosciences (20/21)

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**Table of contents**

1. **Abstract (250 words)**
2. **Introduction (500 words)**

* Circular, (-)ssDNA, genome length
* Brief history from time of discovery to present
* Prevalence of human-infecting Anellovirus (include world map plot)
* Why should we care?

1. **Genomic diversity of the Anelloviridae (500 words)**

* Genome structure
* Describe ICTV taxonomy
* Issues with current taxonomy

1. Include my alignment-free taxonomy

* Mechanisms underlying the emergence of genomic diversity

1. Mutation rate
2. Recombination
3. **Host-virus interactions (500 words)**

* TTV has no stable cell culture or animal model so it is difficult to study
* Mechanisms for regulation of innate immunity
* Mechanisms for regulation of cell-mediated immunity

1. **Pathogenicity (1000 words)**

* Suspected cause of death in pinnipeds (discuss Koch’s postulates)
* Synergistic co-infection causing fatal postweaning multisystemic wasting syndrome in pigs
* Chicken anemia virus causes atrophy of thymus and bone marrow
* No evidence for pathogenicity to humans; studies have only shown that TTV is marker of immune status
* However, we cannot rule out that human anelloviruses can alter disease progression or severity

1. **Transmission Routes (500 words)**

* Horizontal (Dust, dander, feathers, fecal-oral)
* Vertical (placental, breast milk)
* Mosquito vectors (metagenomic surveillance)
* Persistence in environment (wastewater, rivers; i.e. sapronosis)

1. **Host range (500 words)**

* What hosts do the Anelloviridae infect?

1. Diverse host types

* What hosts do single Anelloviruses infect?

1. Cross-species transmission of TTSuV. Virus found in bovine, equine, ovine, canine and elk sera
2. TTMDV and TTV in chimps, humans pigs and cattle

* Seem to be generalists (like Coronaviruses)

1. **Potential animal reservoirs (1000 words)**

* Zoonosis

1. TTSuV
2. Avian Gyrovirus
3. simian TTV, TTMDV

* Anthroponosis as mechanism for creating animal reservoirs

1. TTV and TTMV in captive chimps
2. TTV in swine and cattle
3. Human TTV in swine, bovine and simian sera

* High prevalence in livestock and humans

1. Potential for emergence of recombinant strains (cf. human adenovirus from recombinant Chimp and Bonobo viruses)
2. **Conclusion (500 words)**

* If anelloviruses are arguably not pathogenic to humans, why should we care?

1. Kills livestock
2. Generalist nature potentiates cross-species transmission and possibly the emergence of pathogenic strains

* Stress importance of viral surveillance in animal reservoirs