Bighorn Sheep Paranasal Sinus Tumors: Uncovering Changes within a Respiratory Environment

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ABSTRACT: Paranasal sinus tumors (PNSTs) are an understudied disease in bighorn sheep (*Ovis canadensis*) that confounds research on bighorn sheep respiratory disease. PNSTs are characterized as circumferential, diffuse thickenings of the nasal passages or cranial sinuses. These masses can cause a partial or complete obstruction to air flow with potential impacts on physiology, blood oxygenation, or susceptibility to infectious diseases. The disease progression is unknown and its contribution to mortality is currently unattainable. Therefore, this project aims to deepen the understanding of PNSTs by better understanding the microbial environment associated with the presence of PNSTs. Results from a pilot study are presented here comparing microbial 16S gene sequence data among 9 Colorado bighorn sheep split into 3 different groups: i) with established sinus tumors; ii) with normal sinus tissue from PNST-positive herds; and iii) with normal tissue from PNST-negative herds. The aim of this pilot study is to identify associations between metrics of microbial diversity and the presence of PNSTs. Preliminary results suggest an association between the presence of grade II PNSTs and reduced alpha diversity (i.e., species diversity) of upper respiratory microbes. Reduced microbial diversity can occur because of an infection, immunosuppression, or disruption of anatomical and cellular function. All these factors are or may be related to PNSTs. Next steps include understanding how microbial diversity changes with PNST progression and investigating associations with other disease-associated microbes such as *Mycoplasma ovipneumoniae*.

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