INFLUENZA DETECTED IN *Macronectes giganteus* IN TWO ISLANDS OF SOUTH SHETLANDS, ANTARCTICA

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Abstract: Influenza A virus was detected in different species of birds and migratory aquatic birds. They are the main reservoir of the virus. In this research we detected the first Influenza A virus in Southern Giant Petrel in an Antarctic region. The results represent 0.33% of the samples collected in two breeding areas of the species. Some factors can explain the introduction of these pathogens and diseases in Antarctica, such as bird's migratory behavior and the remains of the virus in cold waters.

Keywords: Southern Giant Petrel, Viruses, Elephant Island, King George Island

Introduction

Influenza A has been detected in humans, pigs, horses, marine mammals and in different species of birds (Webster *et al.*, 1992). Currently 105 species of wild birds have been detected with Influenza A and aquatic birds are the main reservoir of the virus (Olsen *et al.*, 2006). The transmission is poorly understood (Alexander, 2007), however the easiest form of spreading of the virus is in water, remaining infective for 30 days in 0°C (Webster *et al.*, 1978).

In Antarctica Sphenisciformes, Procellariiformes and Charadriiformes breed during the austral summer. Most are long-distance migratory species, excluding penguins, and are observed in diverse and dense colonies in ice free areas (Schreiber & Burger, 2002). However, these breeding areas are scarce hence the proximity of the colonies and the nests make the intra and interspecific transmission of the virus easier. The Southern Giant Petrel (SGP) (*Macronectes giganteus*) breeds in the Antarctic region and has a circumpolar distribution (Patterson *et al.*, 2008) and with other species of seabirds became a potential disperser of several diseases. Barbosa & Palacios (2009) presented a

review of main parasites and diseases detected in Antarctic seabirds and associated different microorganism to SGP. Therefore, the migratory behavior and the presence of several diseases make the SGP an important species to research, not only for the species conservation but for the Antarctic ecosystem. The objective of this research is detecting the Influenza A virus in SGP in two regions in South Shetland Island.

Materials and Methods

The data was collected at Stinker Point (Elephant Island) and Admiralty Bay (King George Island), South Shetlands Island, during three breeding seasons. Two tracheal and cloacal samples were collected from adults and chicks (Figure 1), all the animals were banded to avoid the recapture. The detection was conducted in Biossecurity level 3+ Laboratory. To RNA extraction we used NucliSENS® easyMAG® (Biomérieux) Kit. The viral detection was made by RT-PCR with TaqMan® Avian Influenza Virus (AIV-M) Reagents.

Results

A major number of tracheal and cloacal samples were collected in Elephant Island (Table 1). Influenza A virus was detected in one individual, representing 0,33% of all individuals manipulated. All the samples of Admiralty Bay were negative to virus Influenza A. The detection occurred in a male in Elephant Island (Figure 2). This individual was captured during the 2010/11 austral Summer, January 9th.

Discussion

Despite the SGP that was detected with Influenza A virus in Antarctica, different Antarctic seabirds species have been

reported with some virus infection. Barbosa & Palacios (2009) presented a review about the health of Antarctic and sub-Antarctic seabirds describing nine species with six different virus infection. These species are six penguins (*Aptenodytes patagonicus*, *A. forsteri*, *Pygoscelis papua*, *P. adeliae*, *P. antarctica*, *Eudyptes chrysolophus*, *E. schlegeli*), one petrel (*Macronectes giganteus*) and one species of skua (*Stercorarius maccormicki*). However the research results show the presence of viral antibody instead of the virus. In South Shetland Island, the same study area of this research, antibody of H1, H3, H7 H9 of Influenza were detected in adults and chicks of *P. antarctica*, *P. adeliae*,

Figure 1. A. Southern Giant Petrel chick in Elephant Island.

Table 1. Samples collected during the three breeding seasons of Southern Giant Petrel in Elephant Island (EI) and King George Island (KG).

	2009/10		2010/11		2011/12		Total
	EI	KG	EI	KG	EI	KG	
Males			36	7	30	4	77
Female			39	10	31	11	91
Chicks	15		58	8	50		131
Total	15	0	133	25	111	15	299

Figure 2. Southern Giant Petrel adults in Elephant Islands.

P. papua, *Stercorarius* sp and *M. giganteus*. The data of this research is similar to preview information, showing that most individuals in the area are not infected. Nevertheless, one individual representing 0.33% of the total sample was detected with Influenza A, emphasizing the importance of the research about Antarctic health.

Regardless of the Antarctic being considered as an isolated environment, this area is impacted by other environments in the planet, as well as by other organisms, like pathogens and diseases. Some factors can explain the introduction of these pathogens and diseases in Antarctica: bird's migratory behavior (Krauss *et al.*, 2007; Olsen *et al.*, 2006) and the remains of the virus in cold waters (Zhang *et al.*, 2006).

Conclusion

Through this data it was possible to detect Influenza A virus in SGP in the Antarctic region. Despite the low number of individuals contaminated, with only one positive result for the virus among two study areas, it is suggested that new research should be performed. This new data would

involve migratory and resident species of different areas in Antarctica, like the Peninsula, the Continent and boundary islands. The transmission of the virus may be facilitated because of the proximity of the nests of the species during their breeding seasons and by the sharing of cold water areas, thus, lake sediments and water could also be analyzed. These breeding groups should be kept under monitoring to verify the permanence of virus in these seabirds.

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A large group of seabirds, likely petrels, swimming in the water. The birds are mostly white with dark wings and heads, and are scattered across the frame. The water is dark and choppy.

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