

# PATHOGENESIS OF H7N1 AND H5N8 SUBTYPES OF AVIAN INFLUENZA VIRUS IN AUTOCHTHONOUS AND COMMERCIAL GEESE (ANSER ANSER)

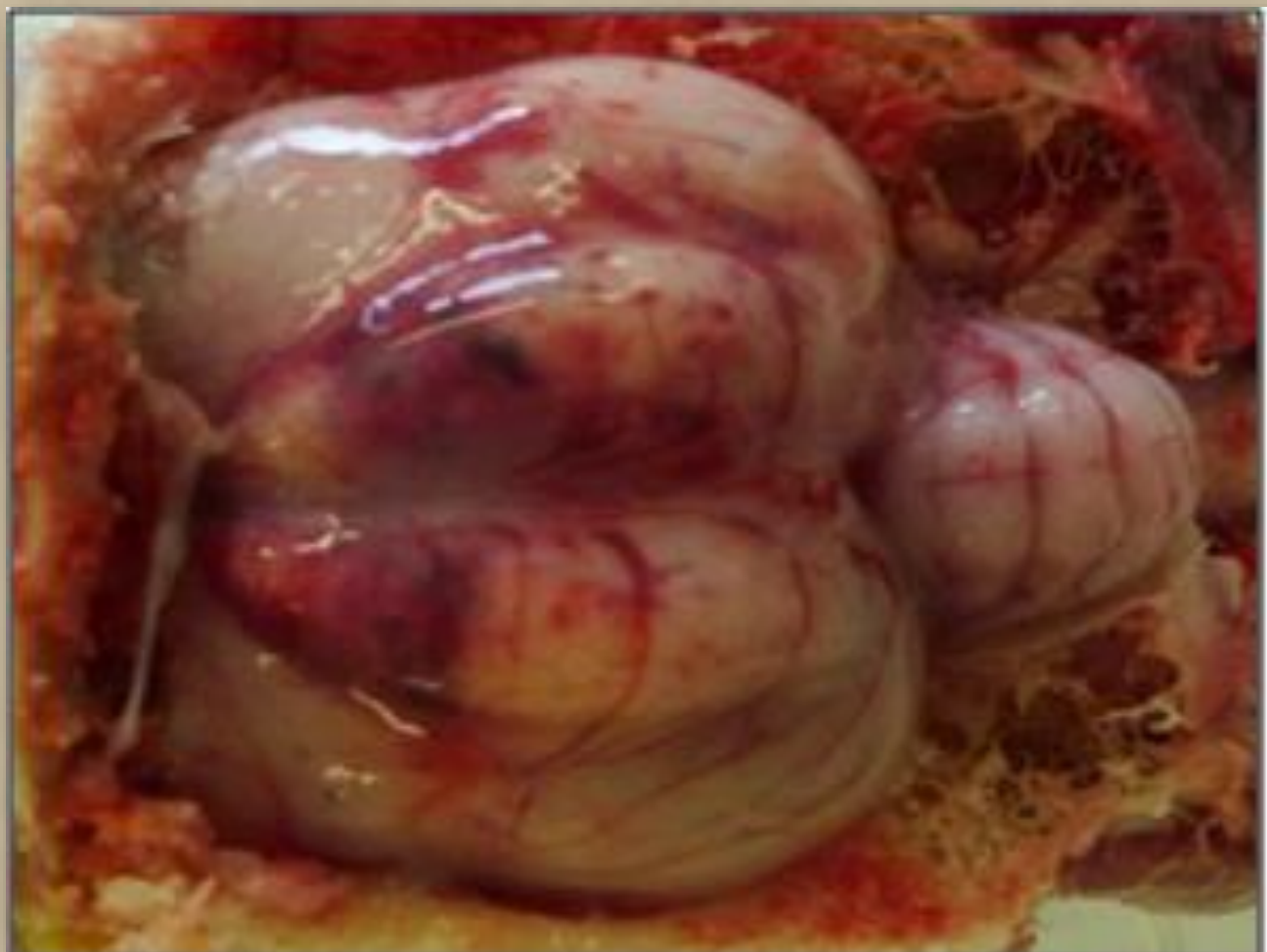
JOAN CAÑAS LLOBERA 04/06/2018

## Introduction

In the last years there have been several outbreaks of avian influenza worldwide, it is an illness with a high mutagenicity and several subtypes which makes it much more difficult for its control.

Since 2014 a new high-pathogenicity H5N8 subtype has appeared in Europe with mortality in wild birds, which until now were resistant to the disease and were only carriers of it.

In this study, two groups of geese, Empordà and commercial have been infected, with the H5N8 and H7N1 influenza virus to see how the virus acts on the body, quantifying the clinical signs and mortality during a period of 15 days post-infection and then look at the amount of viral RNA in different organs



## Objectives

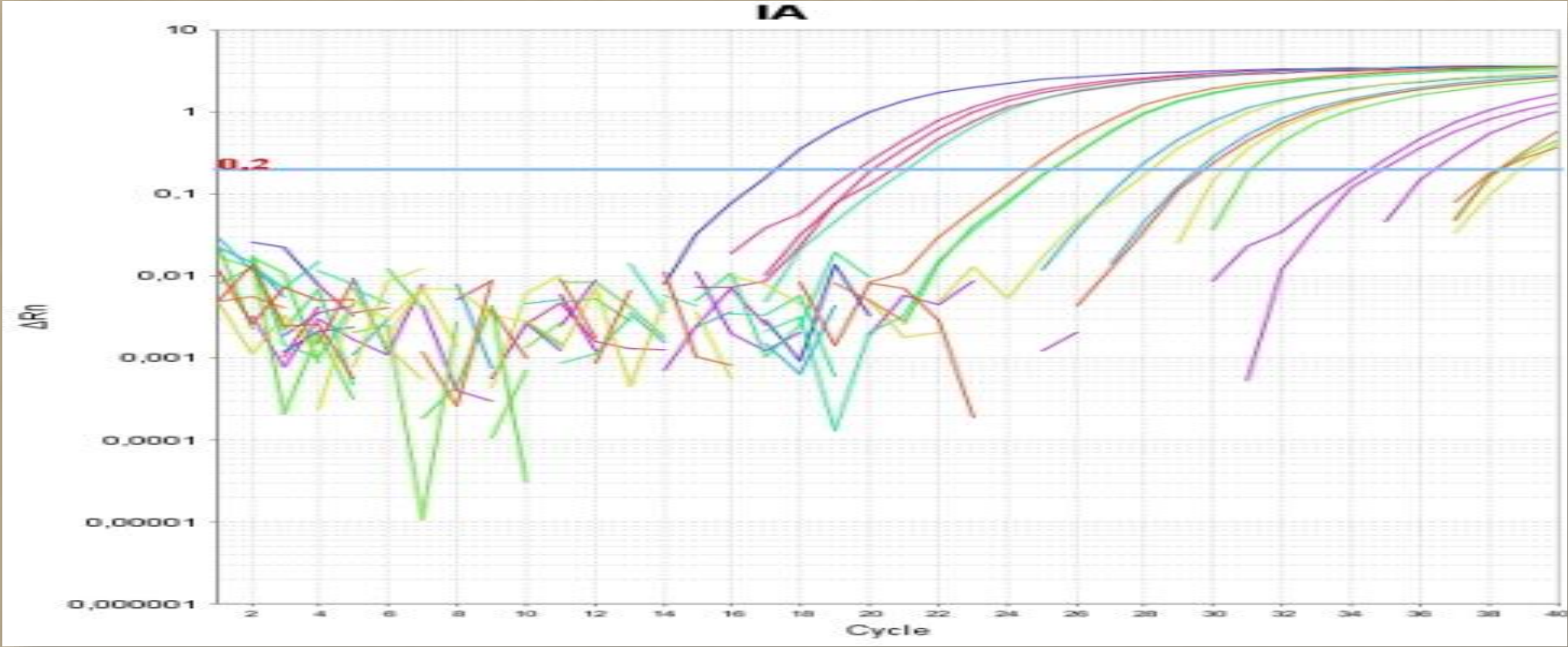
The objective of this study is to observe how the two avian influenza subtypes act on the geese, which are animals that, until the last years, had been resistant to suffering from the disease. Once the study has been completed, we can verify whether the rusticity of the Empordà goose contributes some type of different protection to the virus, and also compare the two subtypes of avian influenza, the H7N1 that is most studied, and the H5N8 that is most recent and it still does not know how it acts on these wild animals.

## Material and methods

•Animals: The animals were geese of the Empordà race and a commercial lineage, they recreated until 3 months of life and later they were infected with the virus and were sacrificed 15 days after infection.

•Virus: In the case of viral strains, the H5N8 used came from the outbreak of avian influenza from Girona in 2017, while the H7N1 came from the outbreak that occurred in Italy in the year 1999-2000.

•Experimental design : Two groups of animals made up of 8 geese of the Empordà race and 5 commercial geese, a total of 13 animals per group. 3 animals were used as a negative control. During the experiment, the clinical signs were observed daily and necropsies were performed on dead animals and slaughtered at the end of the trial.

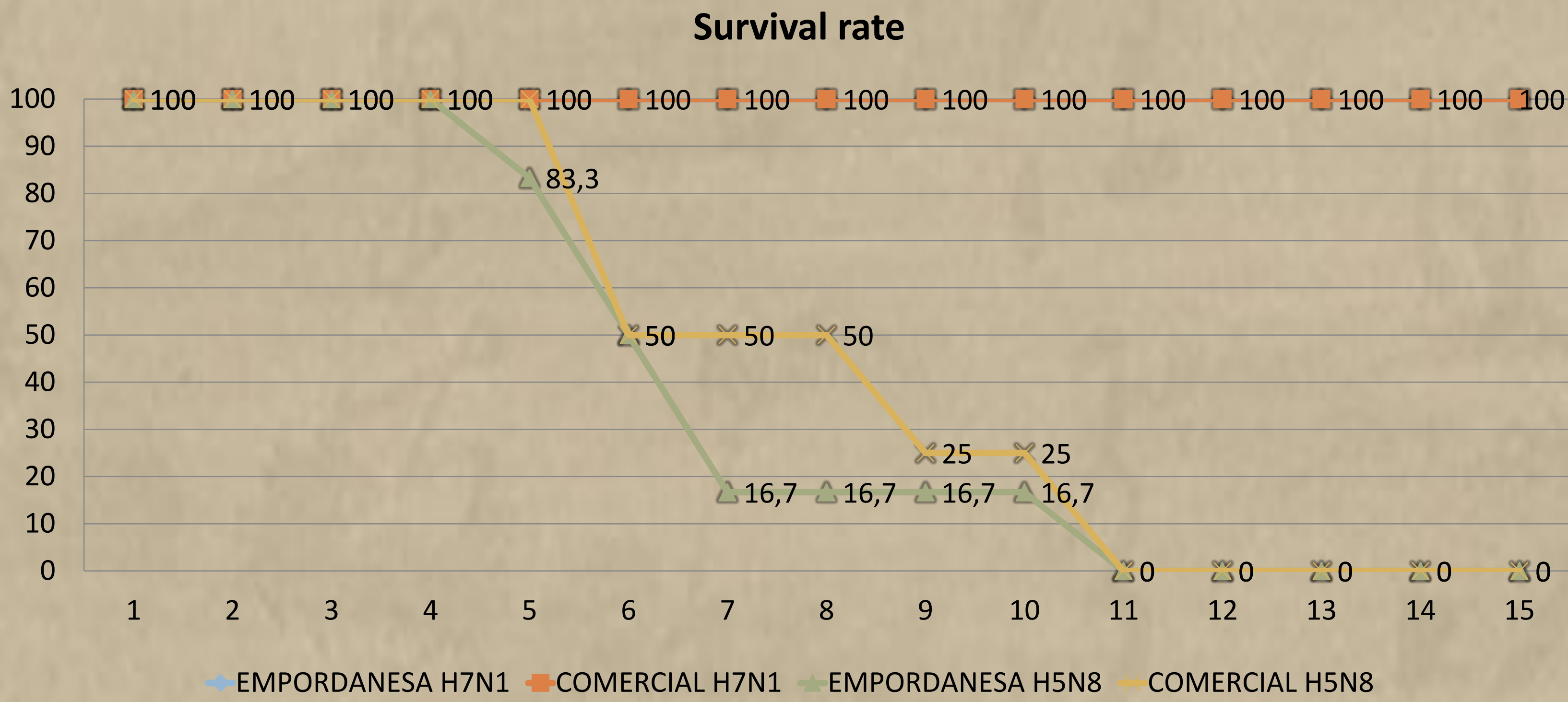


Example of qRT-PCR in a spleen of geese infected with H5N8

•qRT-PCR: Is a technique used to quantify the amount of viral RNA that exists in the sample. It is carried out in a thermocycler applying different temperature changes and detecting the fluorescence emitted when being excited with a specific wavelength.

•Gene expression: using the qRT-PCR technique we will quantify the level of inflammatory cytokines with respect to actin  $\beta$ , which we will use as a reference gene

## Results



Survival rate during the 15 days of infection

GROUP				GROUP			
	SLEEN	LUNG	CNS		SPLEEN	LUNG	CNS
EMPORDANESA H7N1	nd	nd	nd	EMPORDANESA H5N8	21,79	24,56	14,03
	nd	nd	nd		33,84	28,11	14,31
	31,39	29,75	undet		18,69	25,25	34,48
	undet	undet	undet		27,71	25,29	17,19
	undet	38,3	30,97		29,01	29,53	38,94
	undet	undet	undet		21,22	17,18	15,06
	nd	nd	nd		inhib	36,35	19,12
	nd	nd	nd		22,59	20,62	13,93
COMERCIAL H7N1	nd	nd	nd	COMERCIAL H5N8	undet	38,26	22,32
	undet	undet	31,43		31,02	30,26	35,27
	undet	undet	undet		33,55	30,97	13,87
	nd	nd	nd		22,16	21,02	14,04
	undet	undet	undet		25,12	27,75	14,6

Results of qRT-PCR in spleen, lungs and CNS in infected animals with H5N8 and H7N1

## Conclusions

Mortality during the study was 100% in the case of H5N8 and in the case of H7N1 no mortality was observed, the amount of viral RNA found in the organs of the first group was very high while in the second group it was only found in some individuals and with a very high titration.

This difference can be due to different causes:

- The subtype H5N8 seems to be more adapted to aquatic birds than to production birds.
- Despite causing high mortality in gallinaceae, the subtype H7N1 only affects the geese in a subclinical manner.
- The replication of the virus and the subsequent systemic infection is much faster in the case of the H5N8 than in the H7N1.

Other important things to keep in mind is that we find many studies that show that this subtype is the same as in South Korea and that, through migration routes to Europe, therefore it is necessary to emphasize the importance of birds such as geese or ducks in the transmission of this disease.