

Erasmus MC



Viroscience lab

WHERE SKILLS MEET TO STUDY & PROTECT

A microscopic image showing several spherical influenza virus particles. The particles are covered in small, dark, protruding spikes, giving them a textured, bumpy appearance. They are set against a dark, slightly blurred background with some bokeh light effects.

Influenza

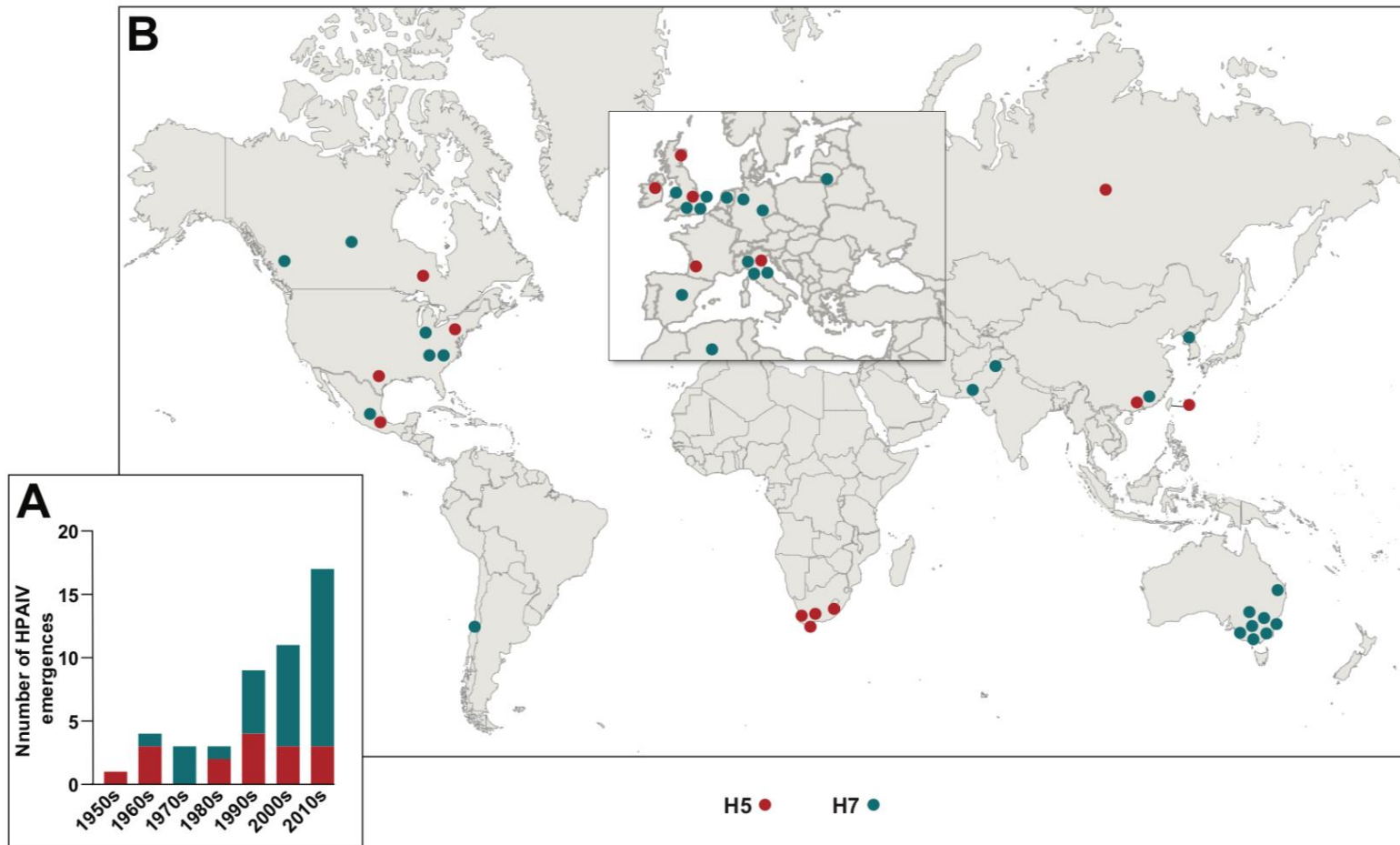
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Virology Course, 5th October 2021

Historical HPAI virus emergence

- First recorded instance of an avian influenza virus was in 1878 in Italy
 - Fowl plague virus
 - H7 HPAI virus
- First H5 HPAIV was isolated in Scotland in 1959



H5N1 emergence: what we know



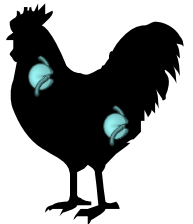
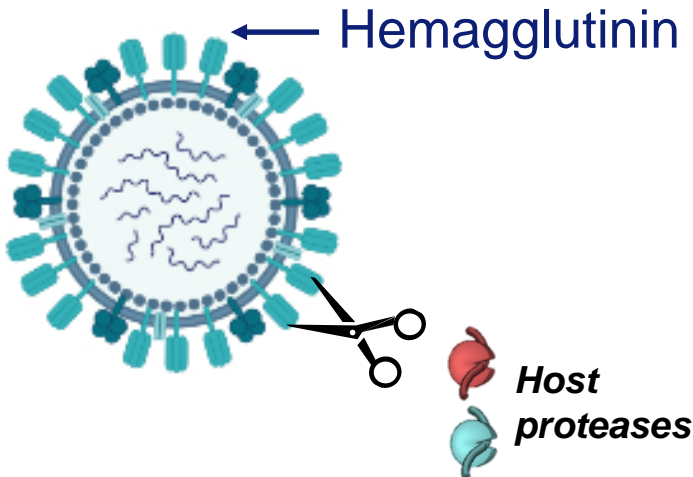
LPAI (mild)

→
+ insertions

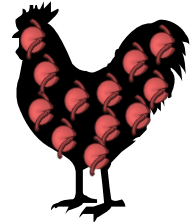


HPAI (fatal hemorrhagic)

- Insertions of nucleotides in hemagglutinin gene



Trypsin-like proteases

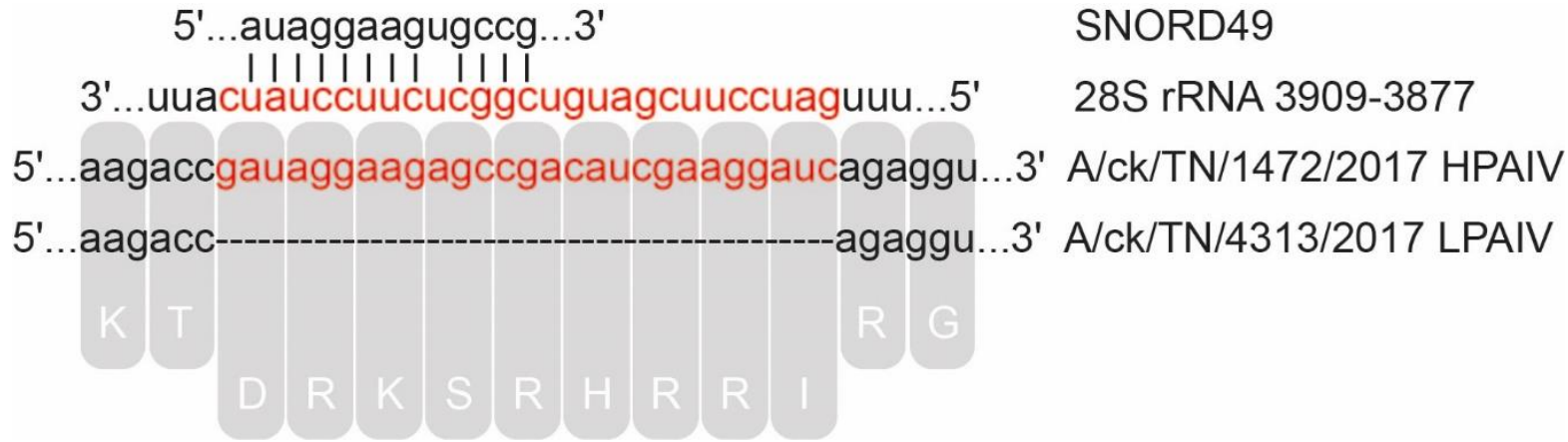


Furin-like proteases

Nucleotide insertion by non-homologous recombination



Recombination of H7 HA with exogenous RNA occurs at small nucleolar RNA binding sites

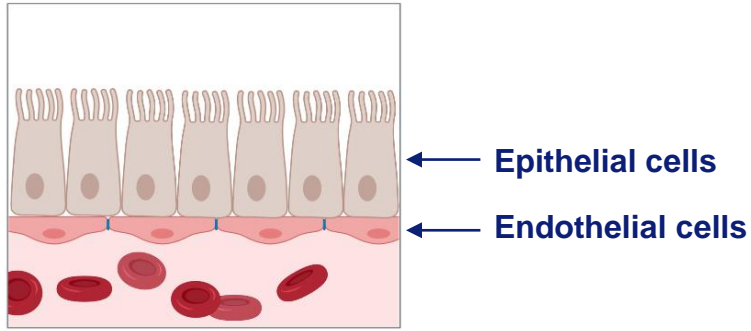
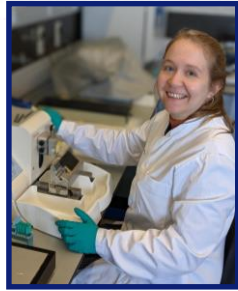


insertion:

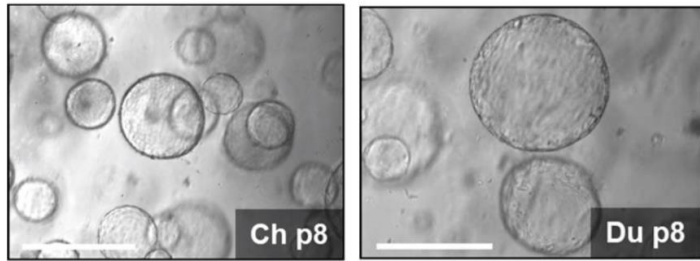
SNORD80	28S rRNA	D	L	Q	V	R	T	A	R	G	tk/OR/1971
SNORD49	- "-	K	S	R	H	R	R	T	R	G	ck/Jal/2012
SNORD49	- "-	K	S	R	H	R	R	I	R	G	ck/TN/1472/2017
SNORD22	- "-	T	T	K	P	R	P	R	R	G	ck/SK/2007
SNORD22	- "-	G	T	K	P	R	P	R	R	G	ck/Spain/2009
SNORD97?	tRNA (?)	P	K	G	S	R	V	R	R	G	ck/Italy/5093/1999, ck/NL/03008927/2003
GGoACA5	NP vRNA	G	P	I	Y	R	R	T	R	G	seal/Mass/1/1980
SNORA2	- "-	L	S	R	C	R	E	T	R	G	ck/Chile/4322/2002
SNORD38	M vRNA	A	Y	Q	K	R	M	T	R	G	Canada/rv504/2004
					P6	P4	P2	P1	P1'		



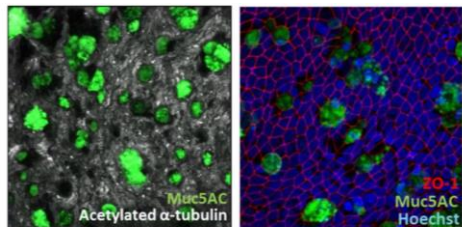
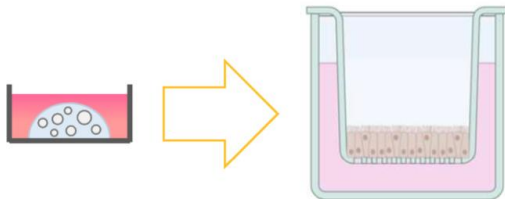
Endothelial cells are not the primary target of HPAIV



AVIAN RESPIRATORY ORGANIDS



EPITHELIAL CELL DIFFERENTIATION

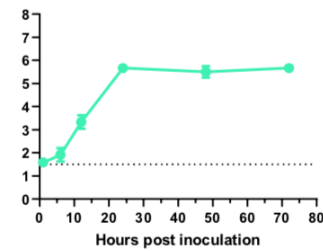
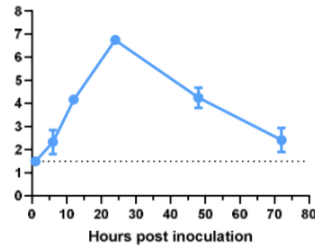


LPAIV MULTI-CYCLE GROWTH

A/Chicken/NL/17014215/17 H5N2 MOI:0,0001

Chicken epithelial cells

Duck epithelial cells



TRANSWELL COCULTURE

