



病毒学各论

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Respiratory viruses

In acute infection of respiratory tract, 90%-95% of cases are caused by viruses.



Respiratory virus

■ Influenza virus	-ssRNA segmented	Influenza
■ Measles virus	-ssRNA	measles (SSPE)
■ Mumps virus	-ssRNA	mumps
■ Parainfluenza virus	-ssRNA	Croup
■ Adenovirus	dsDNA	Pharyngites, pneumonia
■ Rubella virus	+ssRNA	rubella (congenital malformations)
■ Respiratory syncytial virus	-ssRNA	bronchiolitis, pneumonia
	(the most important cause of lower respiratory tract disease in infants and young children)	
■ Rhino virus	+ssRNA	Common cold
■ Coronavirus	+ssRNA	Common cold
■ SARSCoV	+ssRNA	SARS



Influenza virus

- **Comprises influenza A,B and C, viruses.**
- **influenza A** viruses can infect a variety of different species (aquatic birds, chickens, horses etc) and can cause worldwide epidemics of influenza (occur approximately every 10-20years).
- **influenza B** only infects humans and can cause major outbreaks of influenza.
- **influenza C** mainly infects humans and can cause mild respiratory tract infections ,but does not cause outbreaks of influenza



1. Morphology and structure

- **Spherical, 100-120nm in diameter, enveloped, spikes**
- **1) core: -ssRNA, segmented(7- 8 pieces)**
- **2) NP: surround and bind the RNA, type-specific, stable.**
- **3) envelope: M1、 M2、 lipid bilayer membrane**
- **4) spikes: HA、 NA**



Hemagglutinin (HA)

2units: HA1and HA2

- * agglutinate human and some animal RBC**
- * be related to the adsorption of viruses
(receptor : neuraminic acid)**
- * antigenicity: show great variability**

**Abs to the HA are protective, neutralize
viral infectivity.**

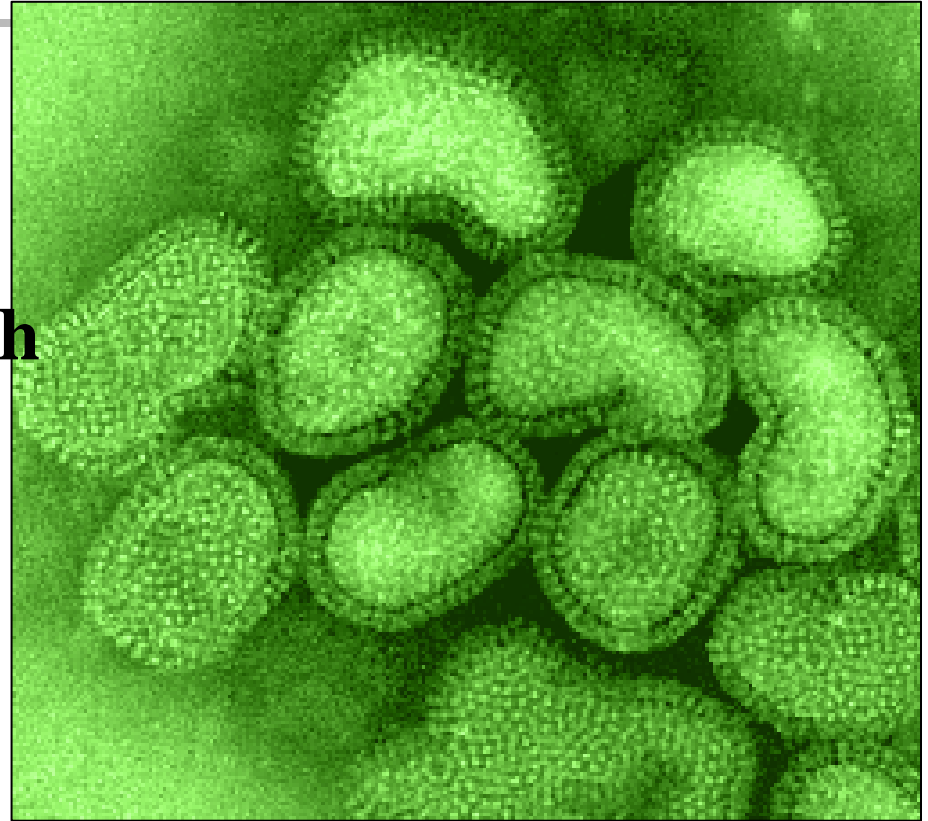


Neuraminidase (NA)

- * be related to the release of viruses:
hydrolyze the terminal neuraminic acid
of glycoprotein on surface of cell.**
- * antigenicity: variable**

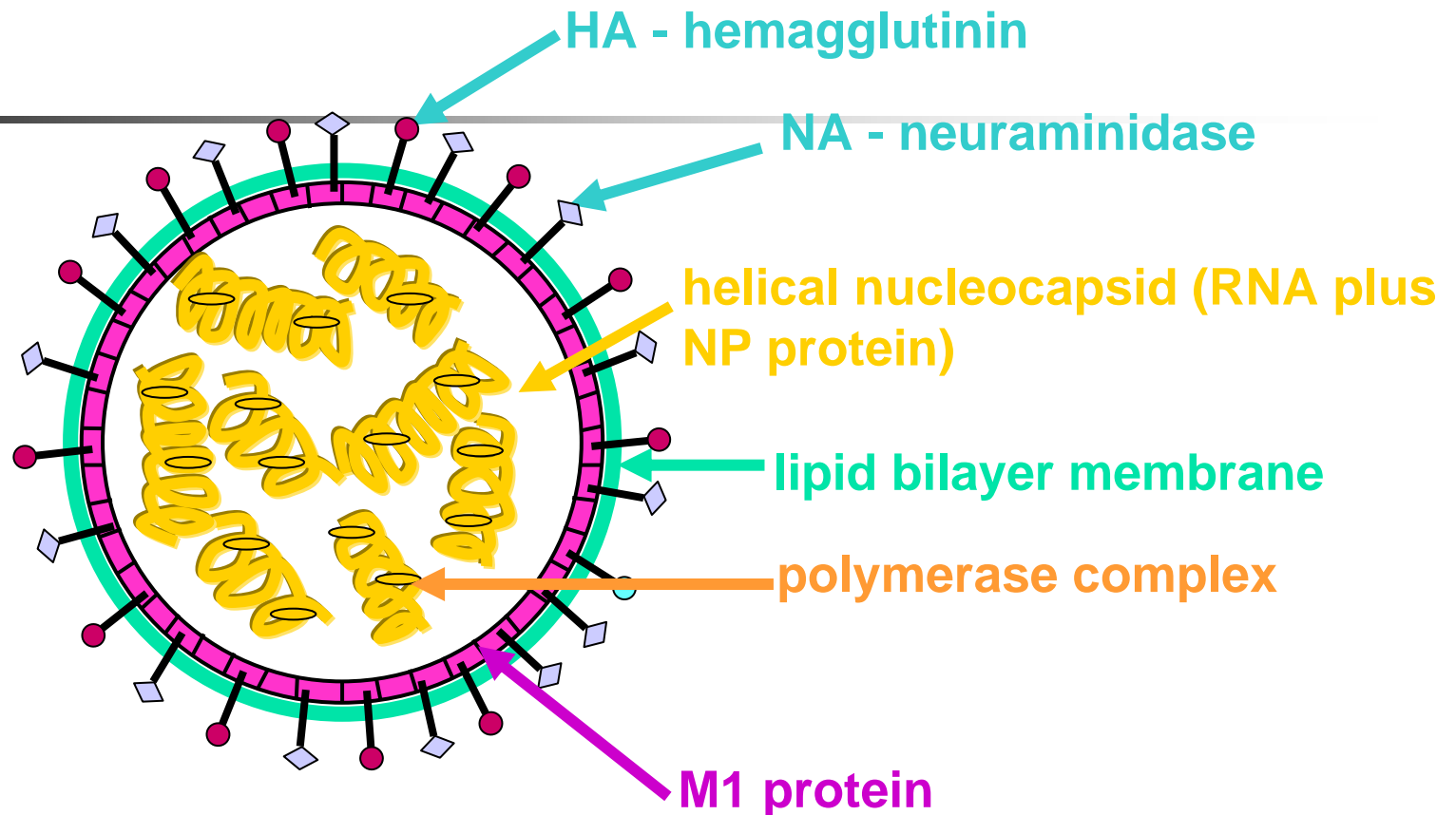
ORTHOMYXOVIRUSES

- **influenza types A,B,C**
- **respiratory illness with systemic symptoms**



<http://www.uct.ac.za/depts/mmi/stannard/fluivirus.html>

ORTHOMYXOVIRUSES



type A, B, C : NP, M1 protein
sub-types: HA or NA protein



2. Type and variation

- **Based on antigenicity of NP and MP:**
 - Influenza A, B, C.
- **Based on HA, NA:** Influenza A subtype ; eg: H1 N1, H3N2
- * **Antigenic drift:** which are minor changes based on mutations in the genome RNA. It can not result in a new influenza A subtype and usually cause median or small epidemic of influenza.
- * **Antigenic shift:** which are major changes based on the reassortment of segments of the genome RNA. It can result in a new influenza A subtype and usually cause large scale epidemic of influenza.



- **3.Cultivation**

- Culture in chicken embryo.**

- Culture in cell culture (non-CPE)**

- **4.Resistance**

- Inactivated 56°C 30min.**



Pathogenesis and immunity

- **is spread via respiratory droplets.**
- **virus particles binds to cells of the respiratory epithelium**
- **Clinical features:**
 - ***respiratory tract symptoms: sore throat, cough etc;**
 - ***systemic symptoms: headache, fever, myalgias (muscle pains).**



IV. Control

- **Vaccine: Whole inactivated virus vaccines ----including H1N1, H3N2 and a B subtype.**