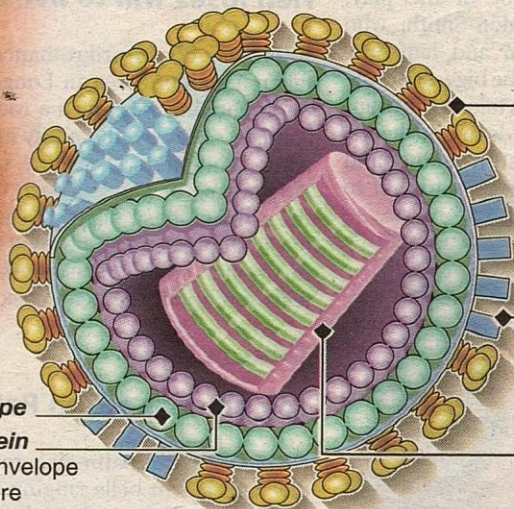
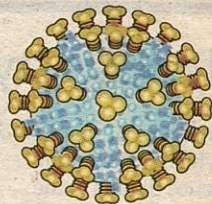


# Inside the swine flu virus

The Mexican swine flu virus is a mixture of four different strains: North American swine flu, North American avian flu, human A/H1N1 flu and a swine flu strain found in Asia and Europe



**Viral envelope**  
**Matrix protein**  
Links viral envelope with virus core

**Influenza A:** Most common cause of flu in humans. Unlike bacteria, viruses do not contain cellular machinery to reproduce – instead, they must hijack host cell in order to replicate

**Haemagglutinin (HA protein)**  
H of H1N1 enables virus to attach to **receptor** on host cell

**Neuraminidase (NA protein)**  
N of H1N1 promotes **budding** – release of newly formed virus particles from host cell. These spread infection within victim

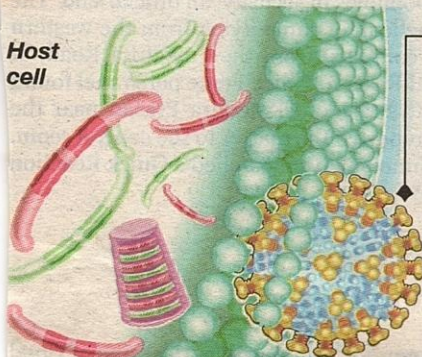
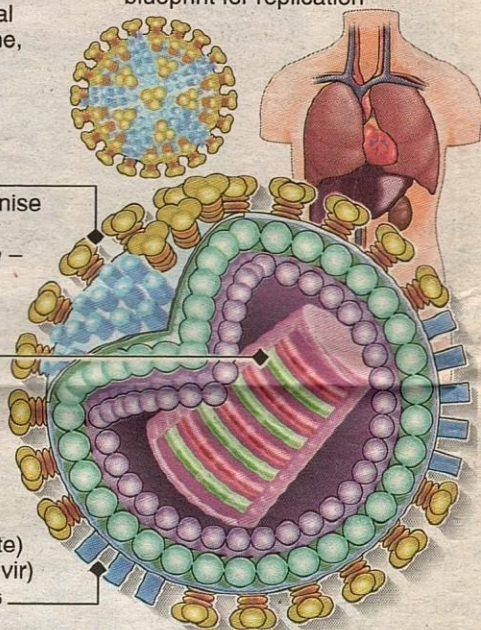
**Virus core – nucleocapsid**  
Eight single strands of **RNA (ribonucleic acid)** contain genetic blueprint for replication

**Re-assortment:** If different viral types infect host cell at same time, new viruses budding from cell can contain jumbled mixture of RNA strands. **New sub-type emerges abruptly**

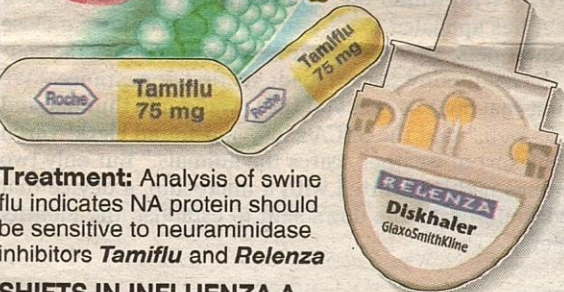
**Human immune system:**  
“Old” antibodies no longer recognise “new” HA and NA proteins. They may also trigger **cytokine storm** – harmful immune overreaction in body that may be lethal in itself

**New RNA genome** – Virus now has potential to spread rapidly between humans

**Neuraminidase inhibitors** – Tamiflu (oseltamivir phosphate) and Relenza (zanamivir) stop budding process

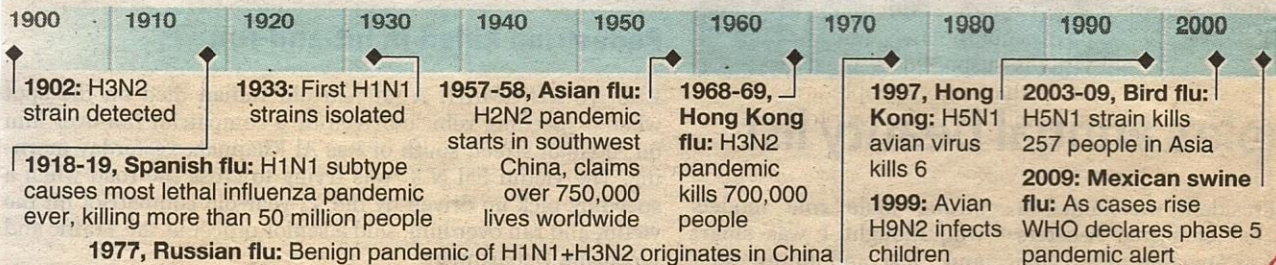


Host cell



**Treatment:** Analysis of swine flu indicates NA protein should be sensitive to neuraminidase inhibitors **Tamiflu** and **Relenza**

## SHIFTS IN INFLUENZA A



### 3 die in Congo crash

**KINSHASA:** A Boeing 737 on a test flight crashed southeast of Congo's capital on yesterday, killing at least three people, officials said. The aircraft suffered unknown "technical problems" shortly after taking off Brazzaville, capital of neighbouring Republic of Congo, Transport Minister Matthieu Mpita said. Mpita said three bodies had been found so far and a high death toll was not expected because the plane was on a test flight. Earlier, Congo Gov Richard Ndambu said the plane crashed about 210km southeast of Kinshasa in the province of Bandundu. — AP

### 2 aid workers freed

**KHARTOUM:** Two foreign aid workers kidnapped and held in Sudan's war-ravaged Darfur region for more than three weeks were freed yesterday, their abductors and the Foreign Ministry said. "We've handed them over to the local authorities in Ed el-Fursan (South Darfur)," one kidnapper said by satellite telephone, asking not to be identified. A senior official in the foreign ministry confirmed that the two had been released and were in good health. "The Sudanese government confirms their release. They are in good health, in good shape," Ali Yusef, responsible for protocol at the ministry, said of the two women, a French citizen and a Canadian. "They will arrive in the evening" in Khartoum, he added. — AFP

### Lebanon frees generals

**BEIRUT:** Lebanon released four generals held for nearly four years in the 2005 truck-bomb assassination of former Prime Minister Rafik Hariri after a UN-backed tribunal ordered them freed yesterday, setting off celebrations with fireworks and dancing. Their release from a Beirut prison left the international tribunal in the Netherlands with no suspects in custody after a four-year UN investigation into an assassination that triggered enormous political and sectarian turmoil in one of the Middle East's most volatile countries. The tribunal's decision — after prosecutors said there was not enough evidence to justify their continued detention — was a major setback to the political faction led by Hariri's son Saad. — AP

### 48 killed in Baghdad

**BAGHDAD:** A wave of near-simultaneous bombs ripped through crowded Baghdad markets and a packed minibus yesterday, killing 48 people including women and children, and making April the deadliest month of the year in Iraq. Three blasts occurred within minutes of each other in markets in the impoverished Shiite district of Sadr City and two other neighbourhoods during afternoon rush hour when they were packed with mothers and schoolchildren. "Forty-one people were killed and 68 wounded in three car bombs in market places," an interior ministry official said. "The explosions started about 4:30 pm (1330 GMT)... Among the victims were women and children," added a Sadr City policeman. — AFP