Poxviridae

Pox viruses are largest and most complex of all viruses, that replicate entirely in the cytoplasm of infected cells. Pox **DNA** viruses which usually produce proliferative focal skin lesions and are occasionally fatal when they generalize.

Classification

This family infect a wide range of hosts, and are divided into two subfamilies:

a- *Chordopoxvirinae,* infected vertebrates. There are 10 recognised genera in this subfamily.

b- *Entomopoxvirinae*, infected insects. There are 3 genera in this subfamily.

Chordopoxvirinae are divided into the following genera:-

The Genera of the subfamily *Chordopoxvirinae*

Genera	Member
Orthopox	(Smallpox virus (variola), vaccinia virus, Cow pox, Camel pox, buffalo pox, rabbit pox.
Parapox	Orf (contagious ecthyma), bovine papular stomatitis (Pseudocowpox, Milker's nodules)

Capripox	Sheep pox, goat pox, lumpy skin disease
Suipox	Swine pox virus
Avipox	Fowl pox, pigeon pox, turkey pox, canary pox, and other birds
Leporipox	Myxoma virus, rabbit (shope) fibroma virus,
Molluscipox	Molluscum contagiosum virus
Yatapox	Yaba monkey tumor poxvirus
Cervidpox	
Crocodylipox	

Subfamily Entomopoxvirinae includes:

1-Alphaentomopoxvirus

2- Betaentomopoxvirus

3- Gammaentomopoxvirus

General properties of pox viruses:

1- There are 10 genera

2- Most genera, Brick shape virion 300 x 240 x 100 nm irregular arrangement of tubules on outer membrane.

3. Complex structure with core, lateral bodies, outer membrane and sometimes envelope like orthopoxvirus whereas parapoxvirus are not.

4. Linear ds DNA genome, 130 kbp (parapoxvirus), 165-210kbp (orthopoxvirus), 280 kbp (Avipoxvirus), noninfectious encodes over 100 genes, including DNA dependent RNA transcriptase.

5. Cytoplasmic replication, enveloped viruses released by exocytosis, non-enveloped particles released by cell lysis.

6. Up to 30 different structural proteins have been identified as well as carbohydrate , copper, flavin, biotin, four enzyme included DNA and RNA polymerase.

7- Host range varies by specific virus; zoonoses is common, but small pox only infect human.

Physical-Chemical properties

Para, Capri and Leporipox viruses are ether sensitive, but otherwise all pox viruses are stable and very resistance to temperature change particularly in dry condition.

They last month or years in dust.

Antigenic Differentiation

Morphological features are sufficient to distinguish between Ortho, Para and Capripox genera. Agar gel diffusion (AGDP) precipitation and viral neutralization (VN) will also identify genera.

Trasmission:

Poxviruses are most commonly spread by direct contact. In the case of small pox, the virus is found in lesions in the upper respiratory tract, which can be transmitted to others droplet secretions, and in skin lesions.

Tissue Tropism (Pathogenesis of the virus)

Access is frequently by local **trauma** of squamous epithelium. **Primary replication** is followed **by viraemia** and multiple skin eruptions. The proliferation ballooning and final necrosis of infected cells in the stratum spinosum give rise to the classical scouerce of lesions then spread of the virus.

More rarely virus will replicate in the viscera giving rise to multiple lesions which are often fatal, e.g. Sheep pox, Leporipox.

Immune response and host defenses

People who are infected with small –pox are generally immune to the disease for the rest of their lives.