

# Bovine Papillomaviruses

# Etiology

- Papillomaviridae
- DNA
- Papillomaviruses (PVs) are epitheliotropic viruses that cause benign proliferative lesions in the skin (warts or papillomas) and mucous membranes of their natural hosts.

## To date, twenty-four BPV genotypes are known

*Deltapapillomavirus* (BPV 1, 2, 13, 14),



*Epsilonpapillomavirus* (BPV 5, 8),



*Dyoxipapillomavirus* (BPV 7),



*Xipapillomavirus* (BPV 3, 4, 6, 9, 10, 11, 15),



*Dyokappapapillomavirus* (BPV 16, 22).

- They are the etiologic agent of papillomatosis and neoplasia of the upper gastrointestinal tract and urinary bladder.
- Virus has a predilection for epithelial tissues.



# Transmission

---

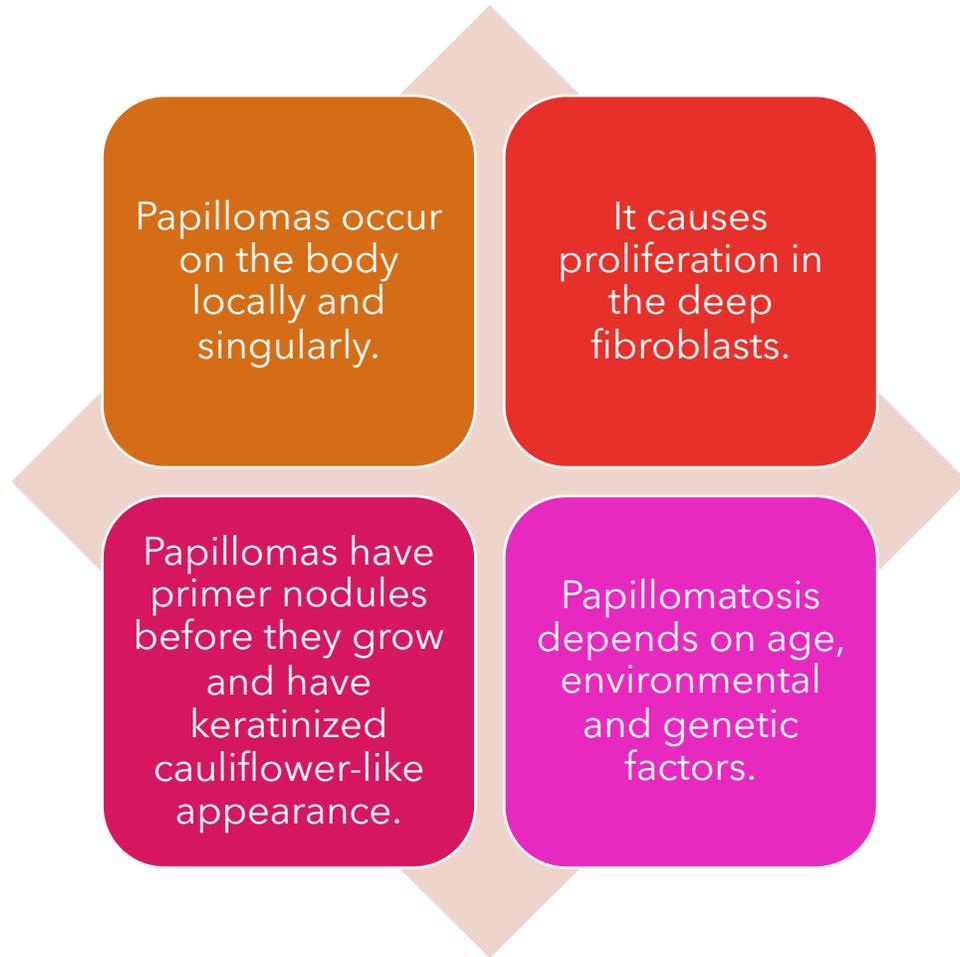
The virus is transmitted by direct contact, fomites,

---

Calves are easily infected the papillomavirus entering the cut or abraded skin.

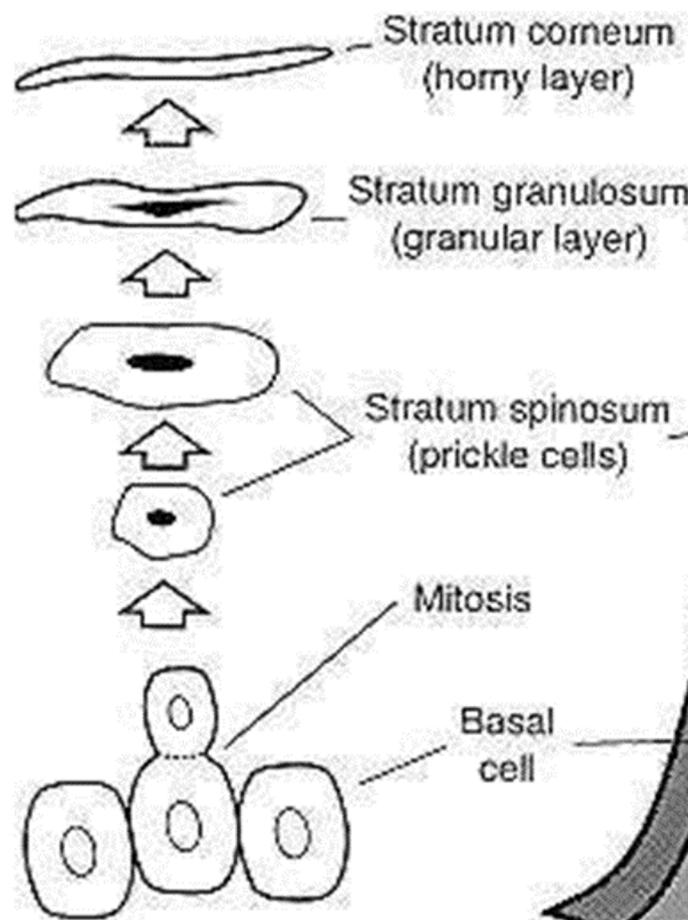
---

Bovine papillomavirus DNA has been identified in blood, milk, urine, and other biologic fluids obtained from infected animals.

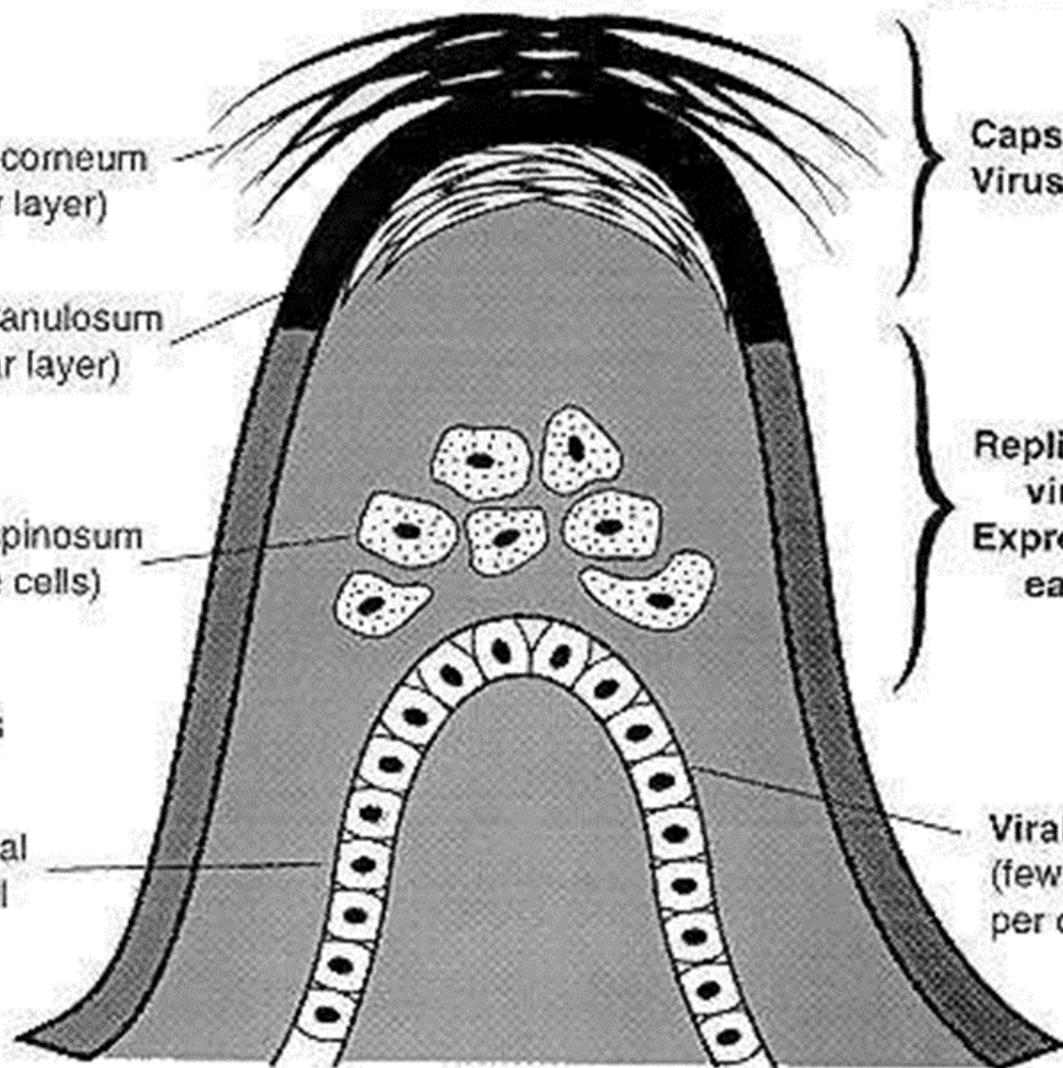


# Pathogenesis

Epidermal Cell  
Differentiation Pathway



Papilloma



Virus Life Cycle

Capsid proteins  
Virus particles

Replicating  
viral DNA  
Expression of  
early genes

Viral DNA  
(few copies  
per cell)





## Clinical Signs

- Warts appear about two months after exposure and may last up to a year.
- Papillomatosis (generalised papillomas) are often seen in calves on the head, neck, and shoulders, and occasionally on the back and abdomen.
- Urinary tumours have also been reported.



- Some lesions develop into papulonodules with a warty surface. Such fibropapillomas may involve the venereal regions.

1- Fungiform Skin  
Papillomatosis:

Fungiform papillomas are formed in the breast and nipples in different regions of the skin, mostly in young cattle.

2- Filiform Papillomatosis:

It is formed in the shape of rice at the beginning of the breast and nipple.

3-Mucosal Papillomatosis:

These occur as Genital Papillomas. Prepusium, Glans Penis and Vaginal Mucosa and in the form of cauliflower.

4-Visceral Papillomatosis:

Papilloma occurs in bladder, in the stomach and pharynx and can be malignant.