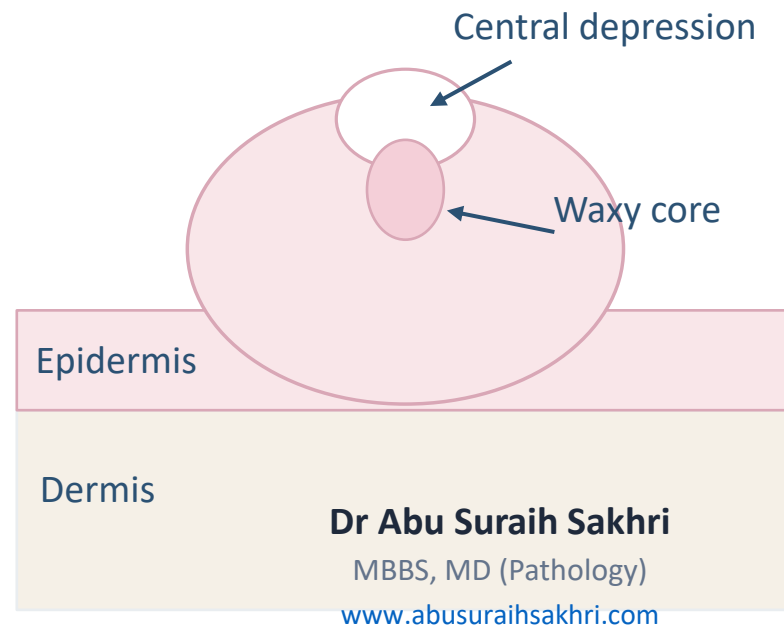


Molluscum Contagiosum

Virology · clinical morphology · dermatopathology · diagnosis



Schematic: exaggerated vertical scale

Learning objectives

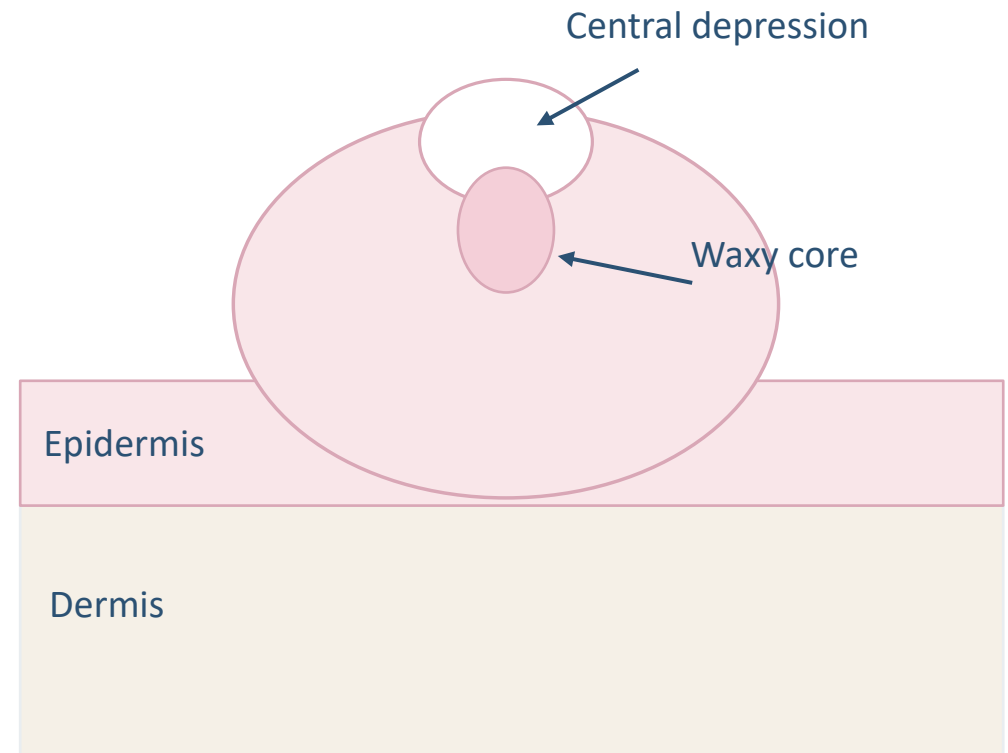
- Identify the causal poxvirus and principal routes of transmission.
- Recognize the typical umbilicated papule and its distribution.
- Explain the cup-shaped hyperplasia and cytoplasmic molluscum bodies.
- Select an appropriate diagnostic and clinical-management approach.

Definition: A self-limited epidermal viral infection

- Molluscum contagiosum is a common, benign infection of the skin caused by a poxvirus.
- The hallmark lesion is a discrete, dome-shaped papule with central umbilication.
- Its defining histologic feature is the intracytoplasmic molluscum body.
- Most infections ultimately resolve spontaneously in immunocompetent people.

Three diagnostic anchors

- Clinical architecture: Firm, smooth, centrally umbilicated papule.
- Epidermal architecture: Crateriform or cup-shaped epithelial hyperplasia.
- Cytopathic feature: Large, eosinophilic or pale-blue cytoplasmic inclusion.
- These three observations connect surface morphology to viral replication.



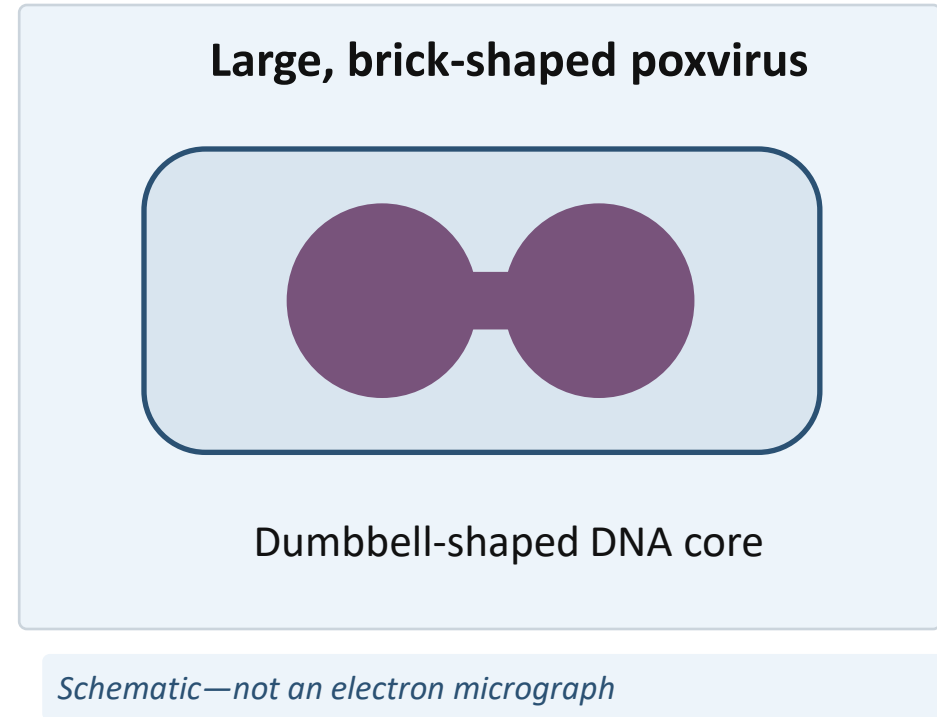
Schematic: Exaggerated vertical scale

What kind of cutaneous infection is this?

Molluscum contagiosum	Verruca vulgaris	Impetigo
Poxvirus infection	Human papillomavirus infection	Superficial bacterial infection
Smooth umbilicated papule	Rough, papillomatous wart	Pustules and honey-colored crust
Cytoplasmic molluscum bodies	Nuclear-associated koilocytosis	Subcorneal neutrophilic pustule

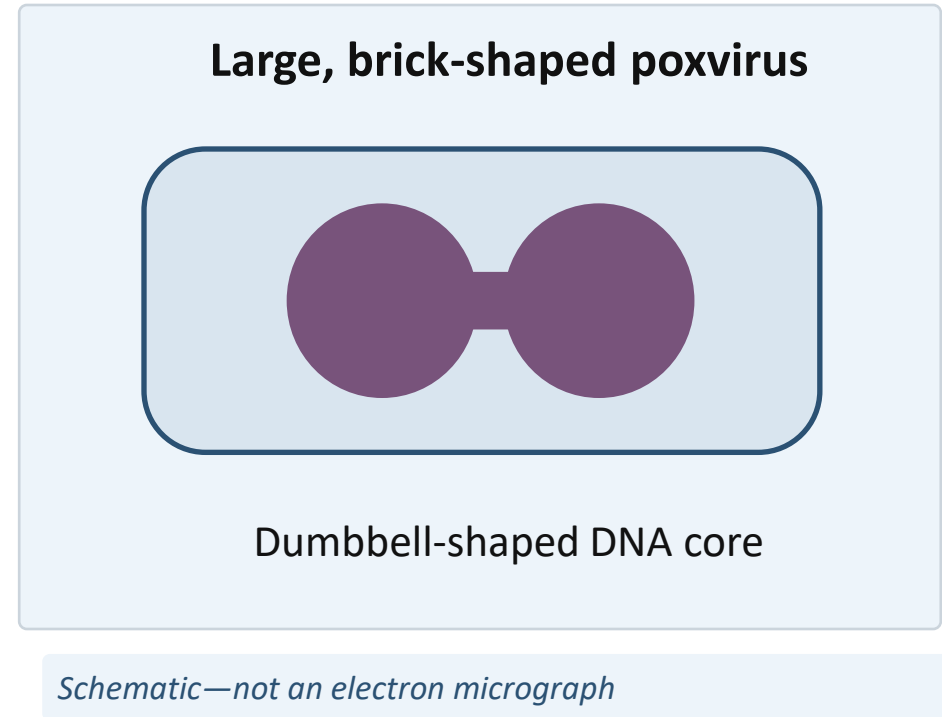
Etiologic agent: Molluscum contagiosum virus

- The pathogen is a member of the poxvirus group.
- Infection produces characteristic cytopathic inclusions in epidermal keratinocytes.
- The viral disease is distinct from HPV-associated cutaneous verrucae.



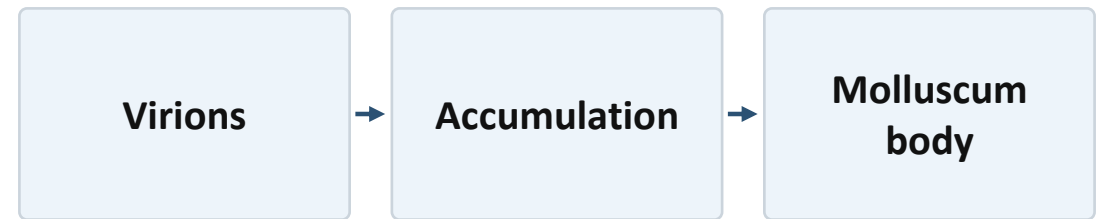
Poxvirus virion architecture

- Virions are characteristically brick-shaped.
- A dumbbell-shaped DNA core is present.
- Robbins gives a maximal dimension of approximately 300 nm.
- This unusually large viral particle should not be confused with a molluscum body.



Virus and inclusion: Different scales

- Virion: Approximately 300 nm at its largest dimension.
- Molluscum body: Up to approximately 35 μm in diameter.
- The large inclusion contains numerous smaller viral particles.
- An inclusion body is a host-cell cytopathic structure, not a single virion.



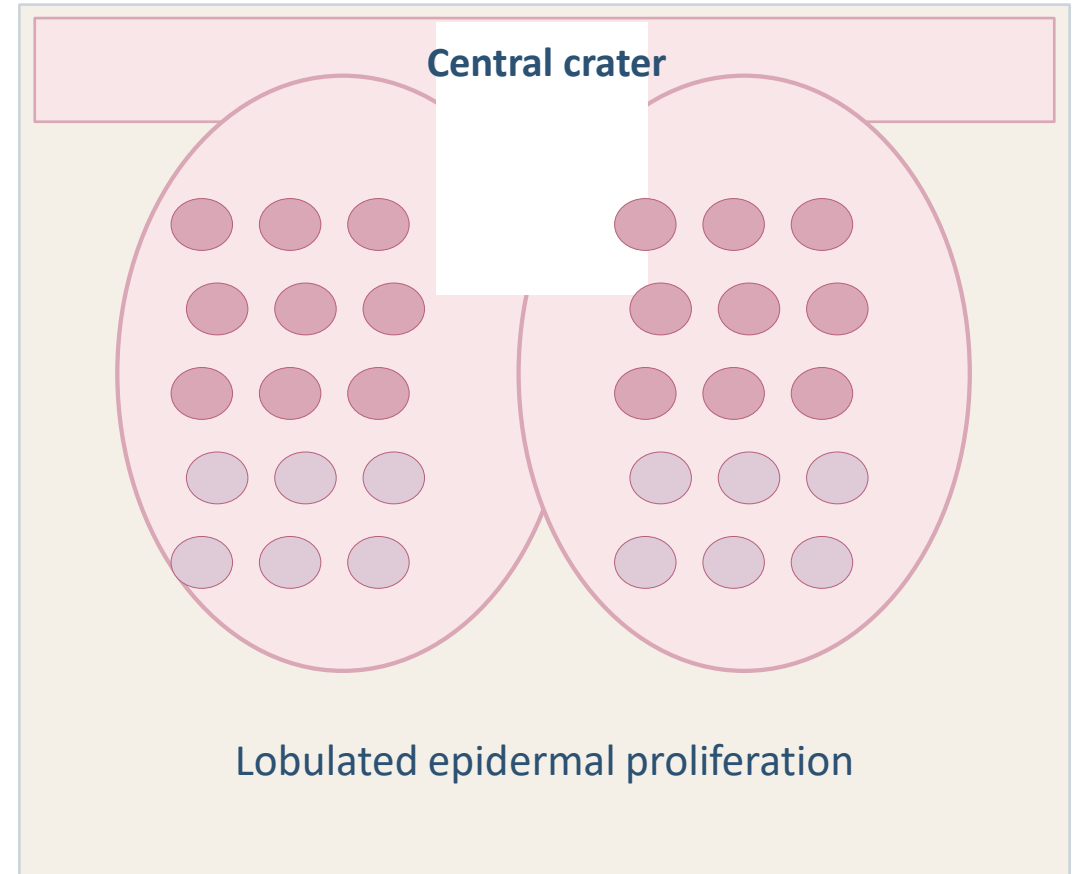
Conceptual sequence

Four MCV types

- MCV-1, MCV-2, MCV-3, and MCV-4.
- MCV-1 is reported as the most prevalent type.
- MCV-2 is described as more commonly associated with sexual transmission.
- Routine recognition of a lesion does not require clinical viral typing.

Epidermis as the site of disease

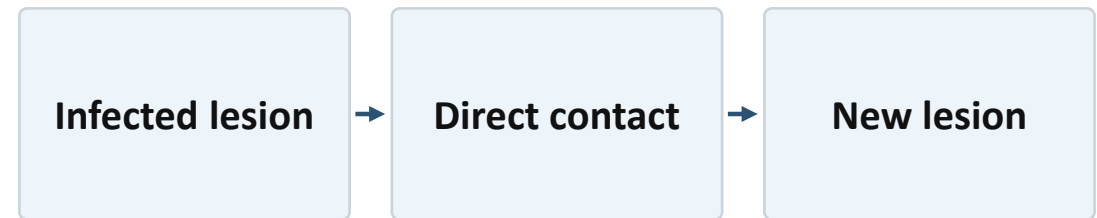
- The dominant tissue response is proliferation of infected epidermal keratinocytes.
- Dermatopathology descriptions emphasize follicular infundibular epithelium.
- The epithelial focus produces a central crater and virus-rich core.
- This localization explains why a classic lesion is a superficial papule.



Schematic—not a histologic specimen

Direct skin contact transmits infection

- Skin-to-skin contact is a major mode of transmission.
- Close contact is common in childhood settings.
- Adults may acquire infection through intimate or sexual contact.
- The infectious material is associated with visible lesions.



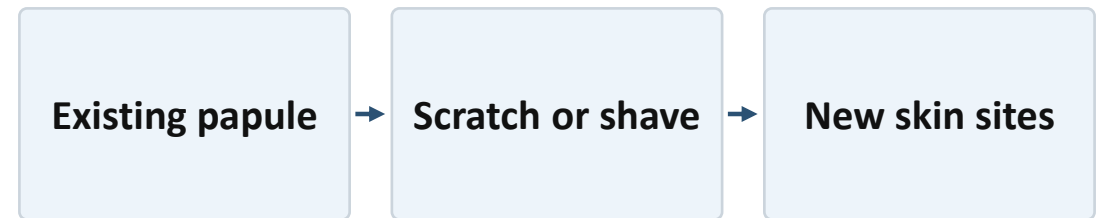
Conceptual sequence

Shared objects may transmit infection

- Robbins mentions shared towels as a route in children.
- CDC also identifies clothing, toys, and shared pool equipment as possible fomites.
- Object-mediated transmission does not require a genital exposure.
- Avoiding shared personal items is a practical preventive intervention.

Autoinoculation spreads lesions on one host

- Scratching or rubbing an infected papule transfers viral material.
- New lesions can appear at adjacent or distant skin sites.
- Shaving and other hair-removal practices may disseminate lesions.
- Linear clusters can reflect repeated local inoculation.



Conceptual sequence

Transmission changes with clinical context

Setting	Typical exposure	Distribution clue
Young child	Direct contact; shared objects	Trunk and limbs
Sexually active adult	Intimate skin contact	Genital and adjacent skin
Any age	Autoinoculation	Groups or linear clusters

Childhood infection predominates

- Young children are a major affected population.
- Robbins Chapter 22 cites ages 2–12 years; CDC highlights ages 1–10 years.
- These are descriptive ranges from different sources, not diagnostic criteria.
- Nonsexual contact is the usual pediatric transmission setting.

Molluscum in adults

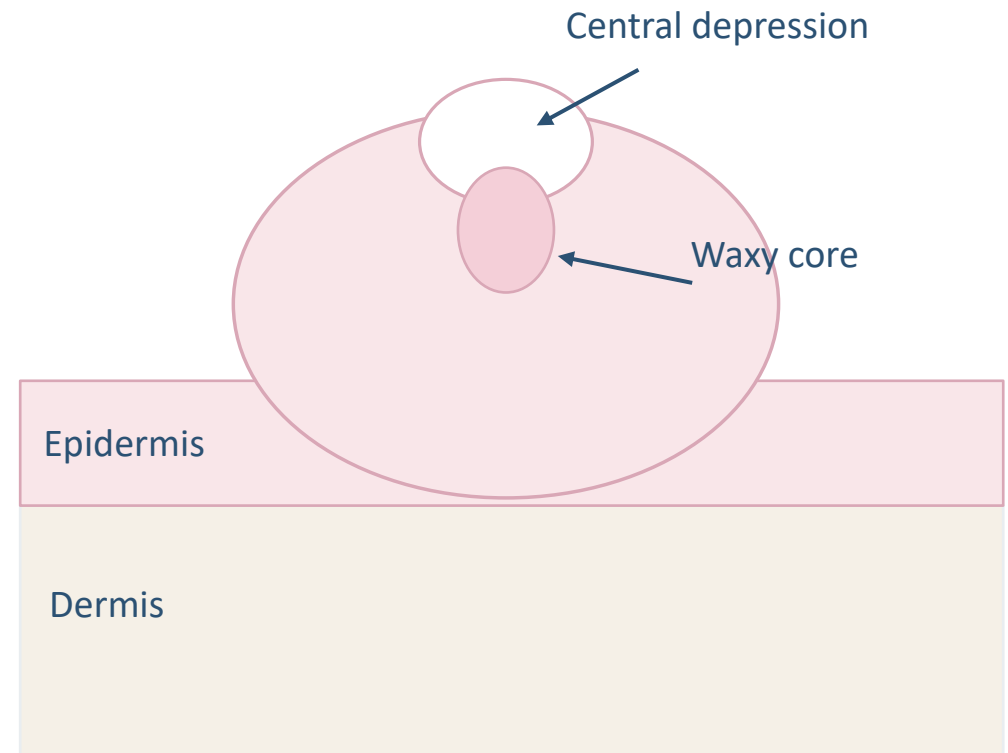
- Anogenital lesions in adults often reflect sexual exposure.
- Relevant sites include genitals, lower abdomen, buttocks, and inner thighs.
- The presence of molluscum does not identify a precise time of acquisition.
- Distribution and history guide an appropriate sexual-health assessment.

Incubation and visible disease

- An average incubation period of about six weeks.
- Clinical lesions may not be visible immediately after exposure.
- A reported recent exposure cannot establish exact transmission timing.
- The infection is recognized when characteristic papules appear.

Typical lesion: Pearly, dome-shaped papule

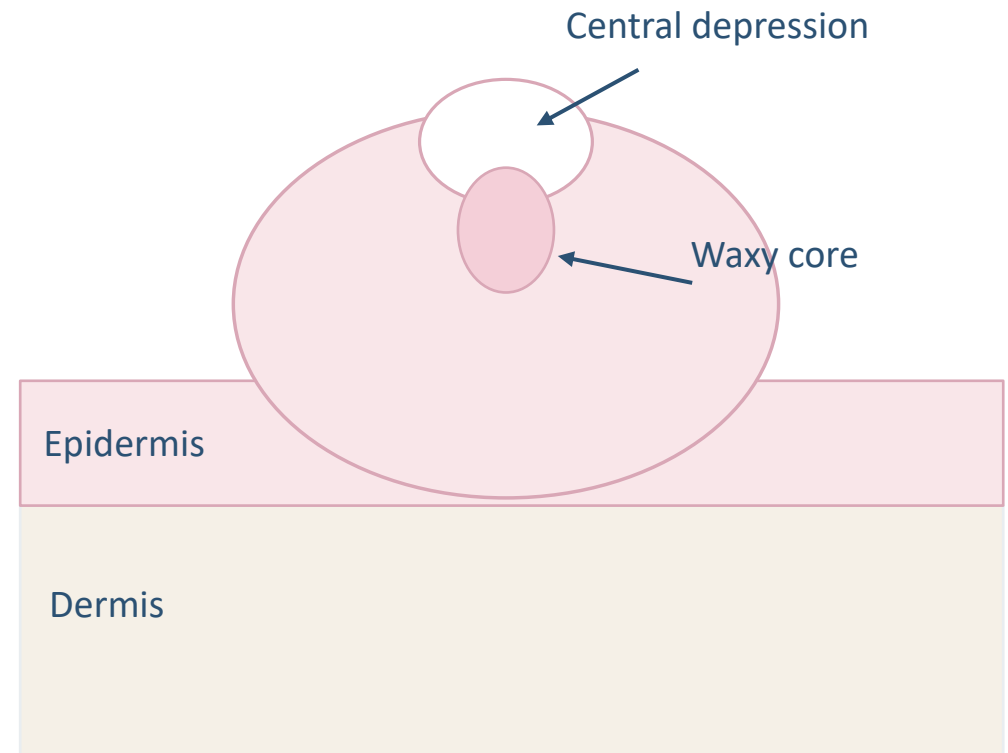
- Papules are firm and often skin-colored or pink.
- A smooth dome-shaped surface contrasts with the rough surface of warts.
- The central pit may be obvious or subtle.
- Most uncomplicated papules are painless.



Schematic: Exaggerated vertical scale

Central umbilication is a structural clue

- Umbilication is a depression at the center of the raised papule.
- It corresponds to the central opening of the crateriform epithelial lesion.
- A white, curd-like core may lie within the depression.
- Umbilication is highly suggestive but is not itself an exclusive diagnosis.



Schematic: Exaggerated vertical scale

The expressible white core

- The central material may be waxy, cheesy, or curd-like.
- Identifying molluscum bodies in a Giemsa-stained smear.
- Expression is a diagnostic observation, not recommended patient self-treatment.
- Squeezing and scraping can cause injury, secondary infection, or spread.

Most papules are only a few millimeters wide

- Robbins Chapter 25: Typically 0.2–0.4 cm in diameter.
- Robbins Chapter 22: Often 1–5 mm in diameter.
- CDC: Average lesion size approximately 2–5 mm.
- These descriptions overlap and should not be treated as hard cutoffs.

Giant molluscum is an unusual presentation

- Rare lesions approaching 2 cm in diameter.
- Atypical or unusually extensive lesions deserve a broader differential diagnosis.
- Marked immune compromise is associated with larger and more numerous papules.
- Biopsy can be useful when morphology is not clinically convincing.

Color is variable; Morphology is more specific

- Papules may be pearly white, pink, or similar in color to surrounding skin.
- Inflammation may produce redness or swelling.
- Do not rely on a single color description across skin phototypes.
- Seek a central pit, lesion grouping, and characteristic surface architecture.

Common anatomical sites

- The trunk and anogenital skin.
- The childhood discussion also includes arms and legs.
- CDC describes widespread cutaneous sites; Palms and soles are unusual.
- Site distribution must be interpreted together with age and exposure.

Anogenital and mucosal lesions

- Molluscum may occur on skin and mucosal surfaces.
- Adults with genital lesions may have sexually transmitted infection.
- Genital papules require careful exclusion of other causes of genital lesions.
- Morphology and distribution, rather than assumptions about behavior, guide work-up.

Pruritus can accompany infection

- Papules are often painless but may itch.
- Scratching increases the opportunity for autoinoculation.
- It also disrupts the barrier and predisposes to bacterial infection.
- Associated itchy dermatitis may be more symptomatic than the papule itself.

Molluscum-associated dermatitis

- Eczematous skin can develop around molluscum lesions.
- The surrounding skin may become dry, pink, and itchy.
- This reaction may obscure a previously classic papule.
- Recognizing the viral lesion prevents mistaking all inflammation for bacterial infection.

Inflammation does not always mean bacterial infection

- A lesion may become inflamed, erythematous, or crusted as it resolves.
- Secondary bacterial infection is a different process after barrier disruption.
- Interpret tenderness, purulence, and surrounding inflammation in context.
- Do not equate every red papule with impetigo.

Secondary bacterial infection is an important complication

- Scratching or rupturing papules can introduce bacteria.
- Impetiginization changes the clinical appearance and may require separate care.
- Immunocompromised patients can experience more consequential infections.
- Infection prevention includes avoiding picking and keeping lesions covered.

Natural history: Often spontaneous clearance

- In immunocompetent individuals, molluscum usually resolves without treatment.
- CDC reports that lesions commonly clear in 6–12 months.
- Persistence for several years is possible in some patients.
- Observation is a valid management strategy for uncomplicated disease.

Resolution and the risk of scarring

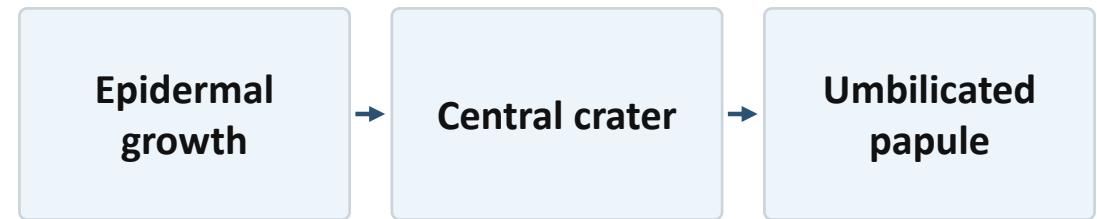
- Unmanipulated lesions generally resolve without scarring.
- Traumatic curettage or squeezing can produce skin injury.
- The choice to treat balances discomfort and spread against treatment harms.
- Scarring risk is particularly important when evaluating cosmetic concerns.

Immunosuppression changes disease severity

- People with impaired immune function may develop many more lesions.
- Lesions can be larger and persist longer than usual.
- The facial region is a recognized site in severe immune deficiency.
- Extensive or atypical infection should prompt assessment of immune context.

Clinicopathologic correspondence

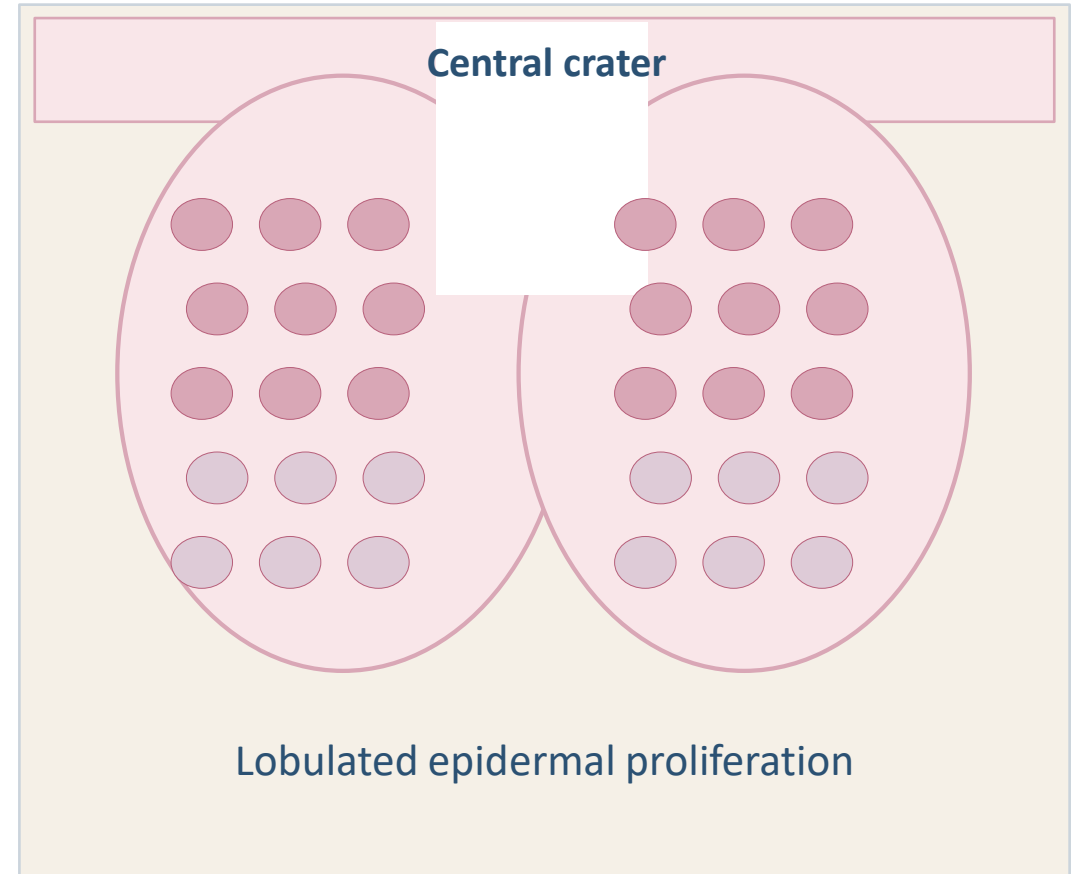
- The raised dome reflects localized epithelial hyperplasia.
- The central pit corresponds to crateriform epithelial architecture.
- The pale core consists of keratinocytes containing viral cytoplasmic inclusions.
- Visible morphology can therefore predict microscopic architecture.



Conceptual sequence

Low-power histology: A cup-like lesion

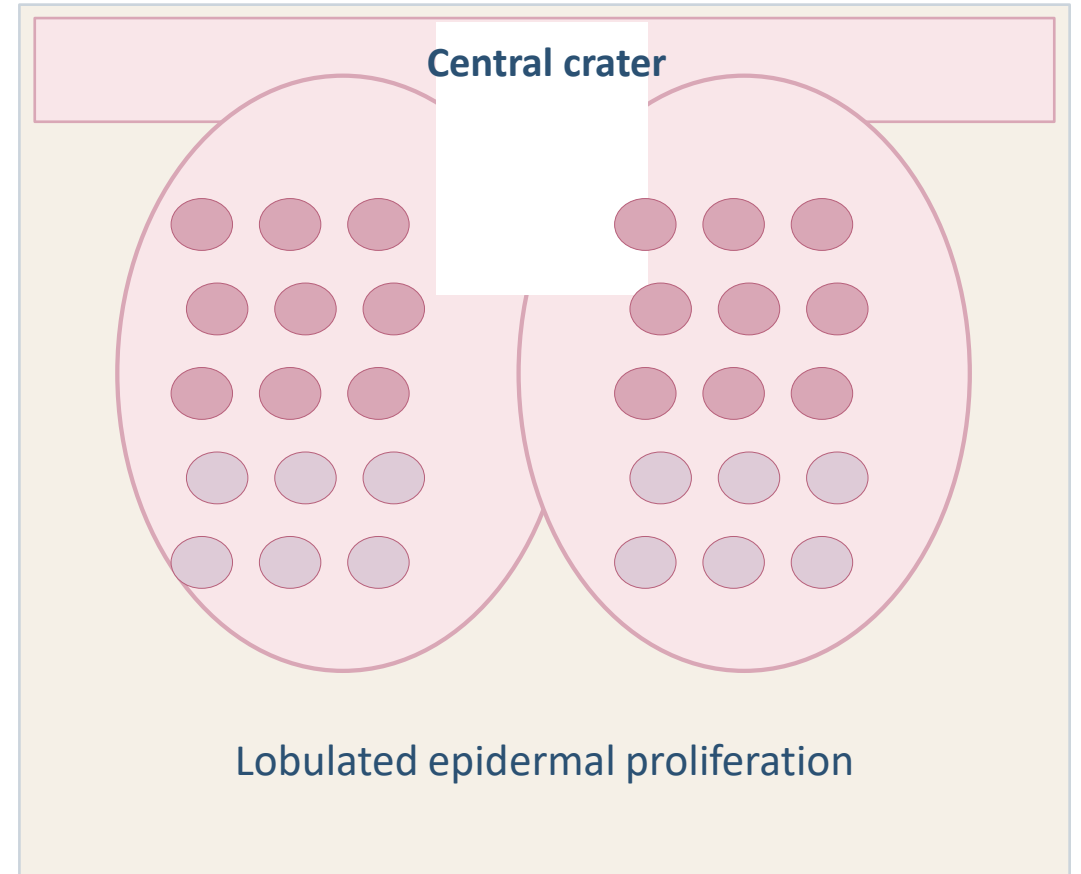
- The epidermis grows downward and around the central crater.
- Cup-like verrucous epidermal hyperplasia.
- The surface opening corresponds to the clinical umbilication.
- A low-power view establishes lesion architecture before cellular analysis.



Schematic—not a histologic specimen

Epidermal lobules converge on a crater

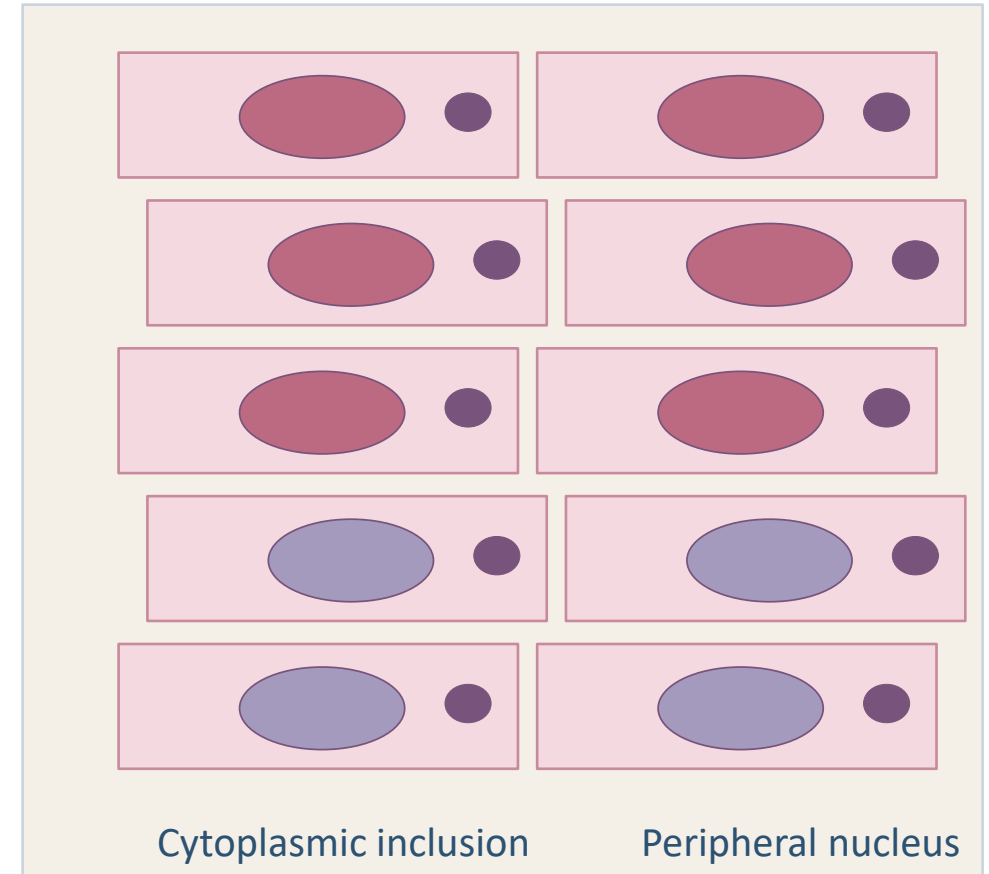
- Prominent keratinocyte proliferation produces a lobulated architecture.
- The crater contains upper epithelial cells and viral material.
- DermNet describes marked follicular infundibular hyperplasia.
- Atypical inflammation or rupture can partially conceal this architecture.



Schematic—not a histologic specimen

High-power histology: Cytoplasmic inclusions

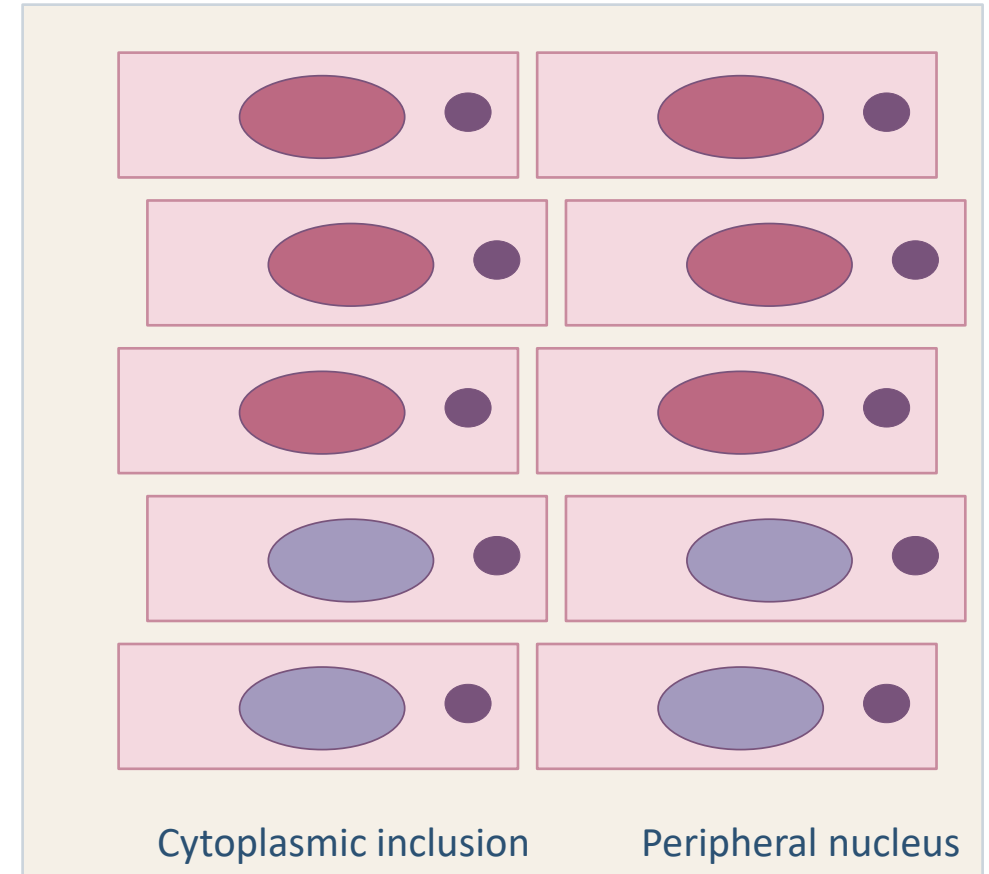
- Numerous enlarged inclusion-bearing cells occupy the lesional epithelium.
- Their cytoplasm becomes filled with dense, homogenous viral material.
- A small residual nucleus is pushed toward the cell periphery.
- These Henderson–Patterson or molluscum bodies establish the diagnosis.



Schematic—not a histologic specimen

Molluscum bodies are intracellular

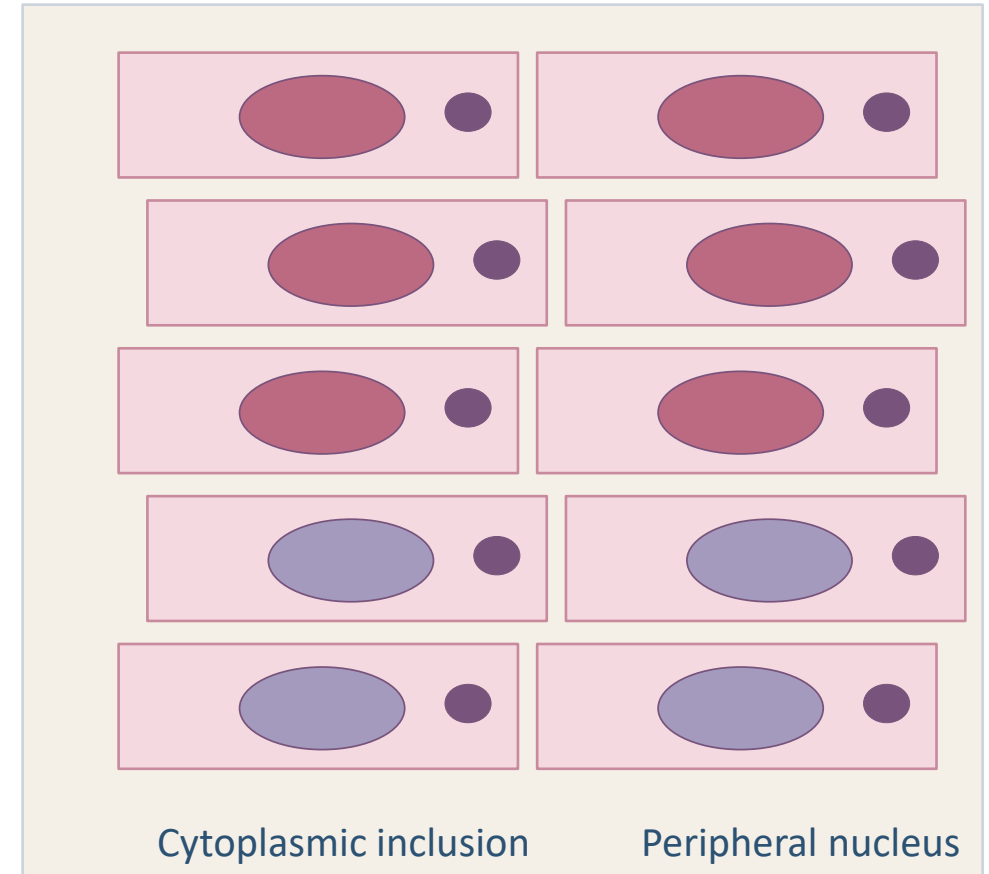
- The inclusion is within the keratinocyte cytoplasm—not its nucleus.
- The inclusion is ellipsoid and homogeneous on routine H&E.
- A peripheral crescent of nuclear material may remain visible.
- This intracytoplasmic location distinguishes molluscum from HPV koilocytosis.



Schematic—not a histologic specimen

Dimensions of the diagnostic inclusion

- Molluscum bodies may reach approximately 35 μm .
- The inclusion is much larger than a single 300-nm virion.
- The large size reflects accumulation of numerous virions in a keratinocyte.
- The inclusion, rather than virus size on light microscopy, enables diagnosis.



Schematic—not a histologic specimen

H&E appearance changes with maturation

- In the stratum granulosum, the inclusions are eosinophilic.
- In the stratum corneum, inclusions may acquire a pale-blue hue.
- The variation depends on the epidermal level being examined.
- Review both mid-epidermal and cornified lesional layers.

Stratum corneum

Pale blue inclusions

Stratum granulosum

Eosinophilic inclusions

Lower epidermis

Keratinocyte maturation

Interpretation of Robbins H&E description

Eosinophilic and pale-blue inclusions are one process

- An H&E hue change is expected as infected cells move toward the surface.
- Do not assign separate diagnoses based only on the two colors.
- Interpret the inclusion in the context of epithelial maturation.
- The surrounding crateriform lesion provides an essential architectural clue.

Stratum corneum

Pale blue inclusions

Stratum granulosum

Eosinophilic inclusions

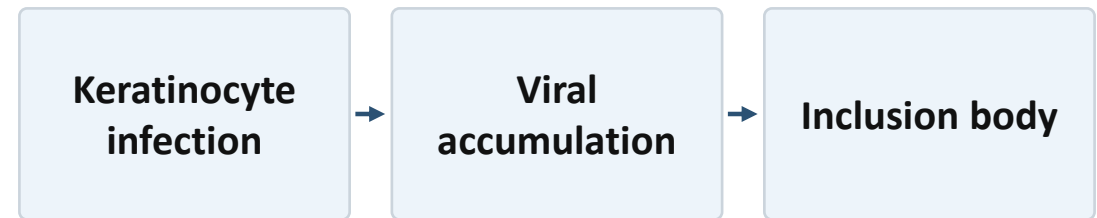
Lower epidermis

Keratinocyte maturation

Interpretation of Robbins H&E description

A molluscum body contains numerous virions

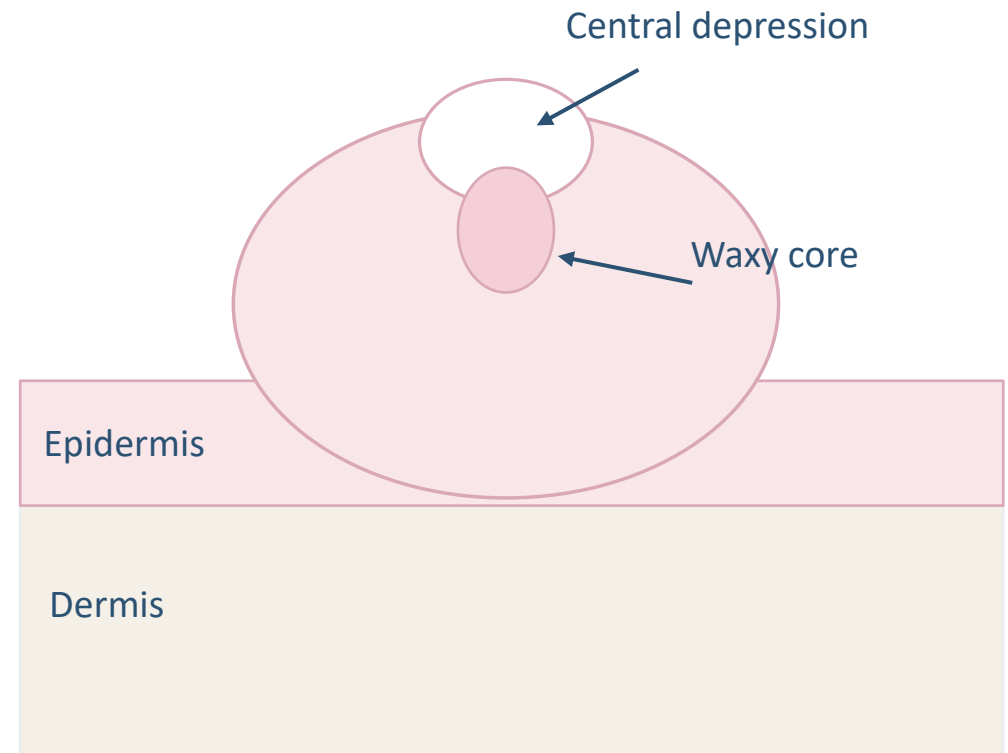
- The large intracytoplasmic inclusion represents virus-rich material.
- Robbins specifically states that numerous virions are found within the bodies.
- Electron microscopy is unnecessary when characteristic inclusions are evident.
- The visible inclusion is a cytopathic correlate of active infection.



Conceptual sequence

Linking microscopy back to the central core

- The central pit overlies a zone rich in infected keratinocytes.
- The curd-like material is derived from this altered epithelium.
- Cytologic sampling of the core may reveal the defining inclusions.
- Clinical, cytologic, and histologic observations are mutually reinforcing.



Schematic: Exaggerated vertical scale

Clinical recognition is usually sufficient

- Typical dome-shaped, centrally depressed papules suggest the diagnosis.
- Lesion distribution and epidemiologic setting strengthen recognition.
- Routine biopsy is unnecessary when the clinical appearance is characteristic.
- Atypical lesions warrant reconsideration of the differential.

When histology becomes valuable

- Unusually large, persistent, or morphologically atypical papules.
- Severe immune compromise with an expanded diagnostic differential.
- Lesions clinically resembling verruca or a keratinocytic neoplasm.
- A disrupted or inflamed lesion in which viral bodies may be focal.

Giemsa smear can identify viral cytopathy

- Expressing the central curd-like core for cytology.
- A Giemsa-stained preparation may reveal molluscum bodies.
- This method samples the inclusion-rich central lesion material.
- It is a diagnostic technique, not a recommendation for home lesion expression.

Biopsy interpretation: A four-step sequence

- First identify epidermal crateriform or cup-shaped hyperplasia.
- Next locate the inclusion-rich portion of the lesional epithelium.
- Verify homogeneous cytoplasmic bodies with compressed peripheral nuclei.
- Finally assess rupture, inflammation, or secondary surface infection.



Conceptual sequence

Special stains usually add little

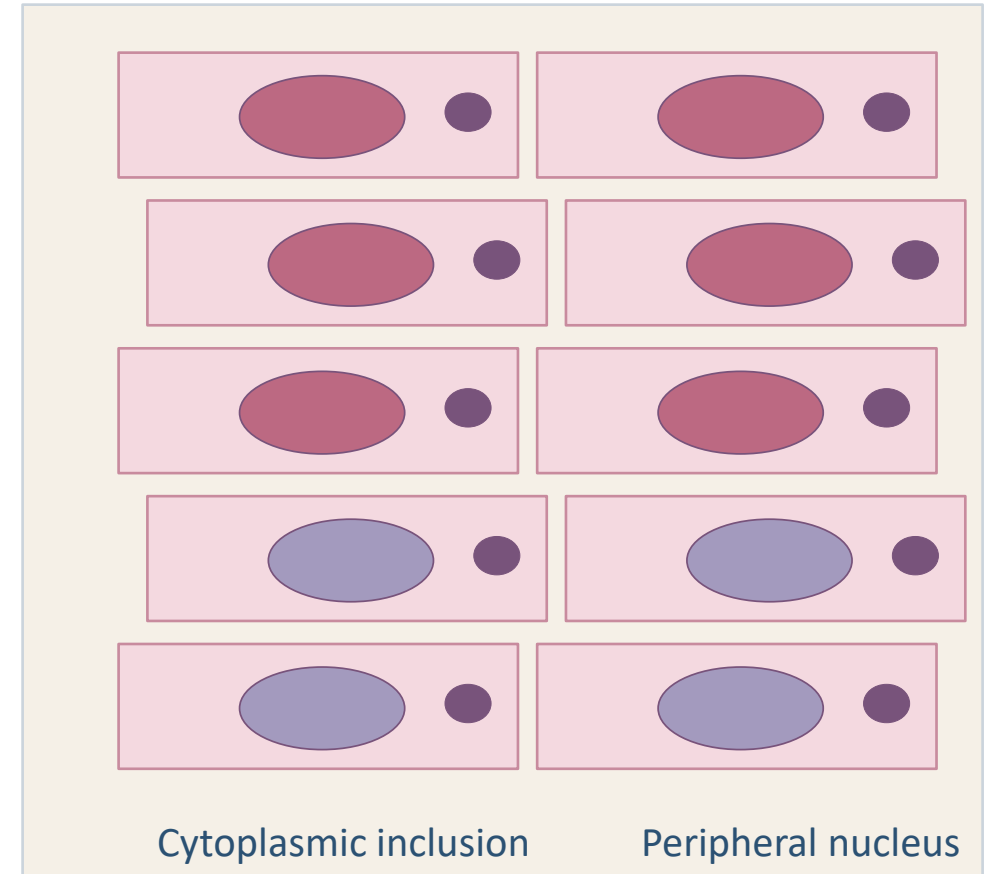
- H&E morphology generally makes the diagnosis.
- DermNet notes that the characteristic inclusions limit special-stain utility.
- Lendrum phloxine–tartrazine staining is a described specialist technique.
- Ancillary work-up is targeted to alternative diagnoses rather than routine cases.

Molluscum versus verruca vulgaris

Feature	Molluscum contagiosum	Verruca vulgaris
Etiology	Poxvirus	Human papillomavirus
Surface	Smooth; umbilicated	Rough; papillomatous
Architecture	Central cup or crater	Papillary epidermal proliferation
Viral cytopathy	Cytoplasmic bodies	Koilocytes with perinuclear halos

HPV koilocytes are not molluscum bodies

- HPV cytopathy involves perinuclear clearing and nuclear alteration.
- Molluscum features dense, large inclusions in the cytoplasm.
- Molluscum lesions form a central cup rather than primarily radiating papillae.
- Cell-level and low-power findings should agree before signing out.



Schematic—not a histologic specimen

Molluscum versus superficial impetigo

Finding	Molluscum contagiosum	Impetigo
Primary agent	Poxvirus	Commonly Staphylococcus aureus
Clinical lesion	Umbilicated firm papule	Pustule → erosion → honey crust
Microscopy	Viral inclusions in keratinocytes	Subcorneal neutrophilic pustule
Complication	May become secondarily infected	Primary bacterial infection

Molluscum versus superficial dermatophytosis

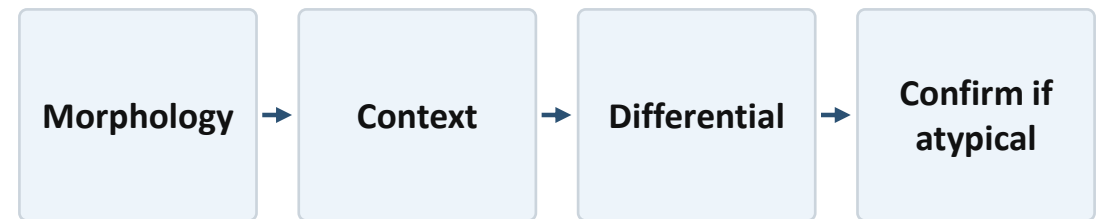
Finding	Molluscum	Dermatophytosis
Lesion	Umbilicated papule	Often annular/scaly plaque
Site of microbe	Epidermal epithelial cells	Cornified layer, hair, or nails
Diagnostic finding	Cytoplasmic viral bodies	Fungal hyphae in keratin
Helpful study	Clinical features or H&E	KOH / PAS depending on setting

Rupture and inflammation may mask viral bodies

- Follicular rupture can generate suppuration and marked inflammation.
- Inclusion-bearing epithelial cells may be sparse in the most inflamed region.
- Examine less-disrupted epithelium and adjacent sections if necessary.
- A heavy infiltrate alone should not overturn characteristic viral morphology.

A structured approach to an umbilicated papule

- Confirm whether the surface truly contains a central pit and waxy core.
- Assess distribution, age, exposure history, and immune status.
- Look for morphology inconsistent with molluscum: Rough surface, pustule, scale.
- Biopsy or alternate studies are appropriate if diagnosis remains uncertain.



Conceptual sequence

Observation versus active therapy

- Uncomplicated infection in an immunocompetent patient often resolves.
- Treatment may be considered for symptomatic, extensive, or genital disease.
- Explain that procedures can cause irritation, pain, or scarring.
- Shared decision-making weighs transmission, appearance, symptoms, and burden.

Avoid unnecessary traumatic extraction

- Scraping and squeezing can disrupt skin and promote inoculation elsewhere.
- Office-based destruction must not be equated with home manipulation.
- Mechanical removal can produce post-procedural pain and scar formation.
- Counsel against picking and against unverified online remedies.

Clinician-performed procedures: Risks and tradeoffs

- Cryotherapy, curettage, and laser treatment are options in selected patients.
- They require clinician judgment and often local anesthesia.
- Pain, irritation, and potential scarring can outweigh benefits in mild disease.
- These modalities are not interchangeable with observation in low-risk children.

FDA-approved cantharidin (United States)

- In 2023, the FDA approved topical cantharidin (Ycanth) for molluscum.
- The U.S. Indication includes adults and children aged 2 years or older.
- Administration is by a healthcare provider, not unsupervised home extraction.
- This is supplemental treatment information, not part of the Robbins morphology text.

FDA-approved berdazimer gel (United States)

- FDA approved berdazimer (Zelsuvmi) in January 2024.
- The U.S. Indication includes patients 1 year of age or older.
- Berdazimer is a topical nitric-oxide–releasing treatment applied to lesions.
- Regulatory age cutoffs refer to U.S. Prescribing information, not diagnostic criteria.

Management in immunocompromised patients

- Disseminated or persistent lesions may resist standard local therapy.
- Optimizing underlying immune function is a major management consideration.
- Concurrent bacterial infection and atypical lesions require separate assessment.
- Coordinate care with clinicians managing the underlying immunosuppression.

Preventing spread at home

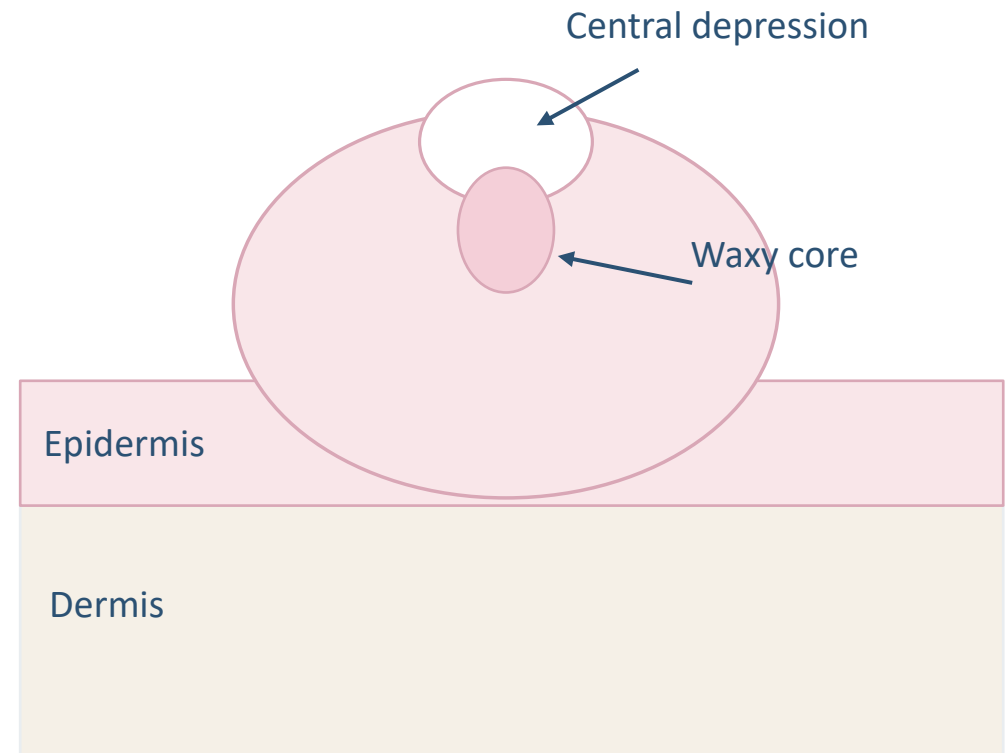
- Cover lesions where feasible and maintain hand hygiene.
- Avoid scratching, shaving across lesions, and sharing towels or clothing.
- Do not squeeze out the contents or attempt home removal.
- Explain that exposure and autoinoculation can produce new lesions over time.

School, daycare, and swimming

- CDC does not recommend excluding children solely because of molluscum.
- Covering lesions reduces opportunities for contact transmission.
- Shared objects, rather than pool water itself, are a more likely pool-associated route.
- Open or secondarily infected sores require appropriate protection and evaluation.

Case 1: Multiple papules in a school-aged child

- A child has several firm, pearly papules on the trunk and upper arm.
- Each papule has a central depression; The child is otherwise well.
- What etiologic agent and route of transmission are most likely?
- Explain why immediate destructive therapy may not be necessary.



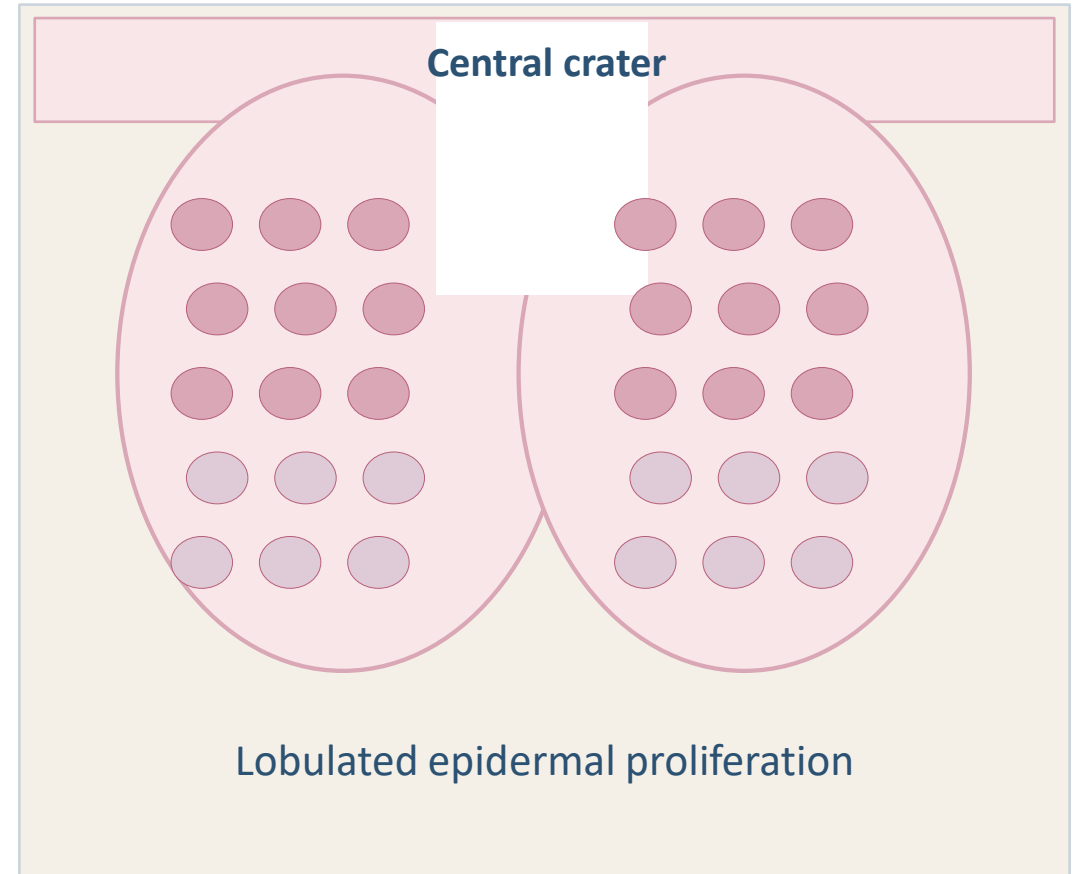
Schematic: Exaggerated vertical scale

Case 1: Clinicopathologic reasoning

- Diagnosis: Uncomplicated molluscum contagiosum.
- Agent: Cutaneous poxvirus; Typical exposure is direct contact or fomites.
- Morphology: Central umbilication corresponds to crateriform epidermal growth.
- Approach: Counsel, observe where appropriate, and reduce autoinoculation.

Case 2: Inclusion-rich epidermal biopsy

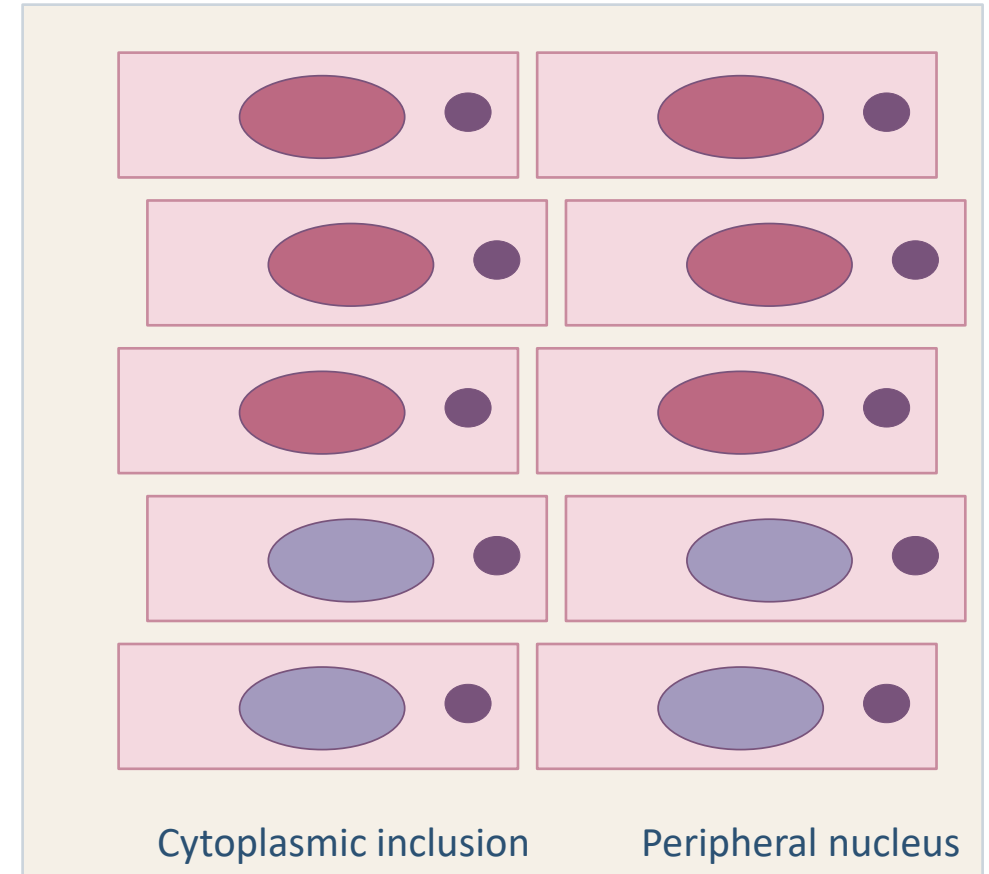
- A small papule is biopsied after uncertainty about a viral wart.
- Histology shows cup-like epidermal hyperplasia and large cytoplasmic bodies.
- The inclusions lie in the granular and cornified epidermal layers.
- Which microscopic feature decisively distinguishes it from an HPV wart?



Schematic—not a histologic specimen

Case 2: The decisive distinction

- Molluscum: Homogeneous, large intracytoplasmic viral inclusions.
- Verruca: HPV-related koilocytosis with nuclear-associated alterations.
- The cup-shaped architecture further supports molluscum contagiosum.
- Do not mistake viral inclusions for isolated keratohyalin granules.



Schematic—not a histologic specimen

Case 3: Unusually widespread facial papules

- An adult with immune suppression has numerous enlarged facial papules.
- Some lesions lack the typical small, neat umbilicated appearance.
- Which clinical context should be considered and why might biopsy be useful?
- What additional issues affect management and prevention of complications?

Case 3: Integrate immune context

- An immune-deficient state can produce more numerous and larger lesions.
- Histologic viral inclusions can resolve uncertain clinical morphology.
- Consider an expanded differential rather than diagnosing from site alone.
- Management addresses immune status, lesion burden, and secondary infection.

Synthesis: Three levels of diagnostic evidence

- Clinical: Pearly, firm, centrally umbilicated papules.
- Histologic: Crateriform epidermal hyperplasia with viral inclusions.
- Cytologic: Giemsa-stained material containing molluscum bodies.
- Immune status and lesion distribution inform diagnostic confidence and care.

Five high-yield points

- Molluscum contagiosum is a self-limited cutaneous poxvirus infection.
- Transmission includes direct contact, shared objects, and autoinoculation.
- Look for a smooth dome-shaped papule with central umbilication.
- Henderson–Patterson bodies are large intracytoplasmic inclusions.
- Observation is often suitable; Atypical or immunocompromised cases need more care.

Selected sources and image-status note

Primary textbook

Robbins, Cotran & Kumar. Pathologic Basis of Disease. 11th ed. (2026). Chapters 25 and 22.

Supplementary clinical and pathology sources

- CDC: Clinical Overview; About Molluscum Contagiosum; Schools and Daycares (2025).
- DermNet: Molluscum contagiosum; Molluscum contagiosum pathology.
- U.S. FDA: cantharidin (2023) and berdazimer gel (2024) approvals.

All cellular and lesion illustrations are original editable schematics, not authentic clinical photographs or histopathology sections.