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Poxviridae

Related terms:
Antibodies, Smallpox, Poxviruses, Herpesviridae, Adenoviridae, Cowpox, Molluscum contagiosum, Orthopoxvirus, Vaccinia, HIV

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Poxviridae

In Fenner's Veterinary Virology (Fifth Editi

The family *Poxviridae* includes numerous
importance. Poxvirus diseases occur in m
considerable economic importance in sor
example, has been eradicated in many co
Africa, the Middle East, and Asia. In contr
birds occur throughout the world. A featu
common ability to induce characteristic "
and/or oral mucosa of affected animals.

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Poxviridae

In Virus Taxonomy, 2012

Phylogenetic relationships within the family *Poxviridae* (Figure 4)
Members of the family *Poxviridae* share a characteristic virion morphology, with subtle differences between some genera. Use of serology, nucleic acid hybridization and restriction enzyme fragment polymorphism are generally limited to within-genus studies. The two subfamilies represent the fundamental difference in hosts, based on whether or not they are chordate. The subfamilies were divided into genera based on host, disease (and *in*

Biology and Diseases of Reptiles

Dorcas P. O'Rourke DVM, MS, DACLAM[a], Kvin Lertpiriyapong DVM, PhD[b], in Laboratory Animal Medicine (Third Edition), 2015

Clinical Signs

Poxvirus infection in crocodiles is associated with high morbidity, but low mortality. Affected animals develop skin le white to brown lesions and either superfic form large lesions. The lesions can be fou pruritic, and can cause the animals to rub inanimate objects. Animals can lose a sub develop generalized edema due to protein for 5–6 months in affected crocodiles. As reported to develop brown papules on var 2011).

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Origin and Evolution of Poxviruses

John W. Barrett, Grant McFadden, in Origin and Evolution of Viruses (Second Edition), 2008

INTRODUCTION

The family *Poxviridae* represents one of the most numerous and geographically widespread virus families that infects animals (vertebrates and invertebrates). Until the recent discovery of mimiviruses, the poxviruses represented the largest, most complex viruses known to virology. The poxviridae include a number of

Poxvirus, Infection and Immunity

R.Paul Kitching[a], Jef M. Hammond[b], in Encyclopedia of Immunology (Second Edition), 1998

The poxvirus genome appears to be very stable in the field situation. Isolates of capripoxvirus collected in Kenya over a 30 year period cannot be distinguished by comparing the genome fragments generated by *Hind*III restriction endonuclease digestion. The orthopoxvirus, vaccinia, has also persisted, little changed, in buffaloes as buffalo pox. Major genomic changes may occur when recombination

takes place between poxviruses during a dual infection. This has been shown to occur not only in the laboratory between strains of orthopoxvirus and between strains of leporipoxvirus, but also in the field between strains of capripoxvirus. Whether recombination could occur between strains of different poxvirus genera is probably unlikely, but within genera there is potential for the evolution of new combinations with an enlarged host range or increased virulence.

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produce transmissible tumors in animals. Unique members of the family *Poxviridae* have evolved on all continents that support suitable hosts, and poxviruses have co-evolved with a variety of hosts to utilize their unique

Viral Infections with Cutaneous Lesions

William J Moss, ... William J Moss, in Hunter's Tropical Medicine and Emerging Infectious Disease (Ninth Edition), 2013

Patient Evaluation, Diagnosis, and Differential Diagnosis
Poxvirus infection should be considered when evaluating a patient with a febrile illness and vesiculopustular rash, particularly when the patient resides in an area endemic for monkeypox virus (Fig. 28.2.1) or has contact with animals capable of transmitting poxviruses. A presumptive di
made clinically based on the characteristic
the skin lesions may be difficult to disting
of illness (Table 28.2-3). Smallpox should
Suspected cases of monkeypox should be

Laboratory diagnosis is necessary to confi
differentiate infection from other causes c
definition developed by the Centers for D
after the 2003 outbreak in the USA is shov
specimens for diagnostic testing include s

Immune Evasion Strategies of Molluscum Contagiosum Virus

Joanna L. Shisler[1], in Advances in Virus Research, 2015

1
Introduction

applied to a microscope slide and air drie
monkeypox virus should be handled in Bi
virus can be identified by cell culture or P
insufficient sensitivity to reliably diagnose

With the exception of smallpox, monkeyp
with varicella (chickenpox) (Table 28.2-3).
monkeypox because the skin lesions of ch
stages of development), concentrated on
and soles. Lymphadenopathy does not oc
illness resolves in two weeks. Other cause
eruptions, eczema herpeticum, dermatitis
molluscum contagiosum [9].

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The *Poxviridae* family is an extensive group of viruses with a broad host range that includes both vertebrates and invertebrates. The best-studied poxviruses belong to the *Orthopoxvirus* genus and include variola virus (VAR; the causative agent of smallpox) and monkeypox virus (MPX; the causative agent of monkeypox). Vaccinia virus (VACV) is highly similar to VAR and MPX viruses and is used as a vaccine to protect against both infections (Moss, 2013).

Molluscum contagiosum virus (MCV) is the sole member of the *Molluscipoxvirus* genus (Moss, 2013). MCV is a dermatotropic poxvirus that causes benign epithelial neoplasms (molluscum contagiosum, MC) in humans. There are several striking characteristics of MCV that make it unique in comparison to the well-studied members of the *Orthopoxvirus* genus. First, MCV causes a persistent infection with little to no inflammation. In contrast, MPX and VAR viruses

Neurovirology

Philip E. Pellett[1]*, ... Thomas C. Holland[1], in Handbook of Clinical Neurology, 2014

Poxviruses

The poxvirus family (Poxviridae) contains two subfamilies (Chordopoxvirinae and Entomopoxvirinae). Poxviruses that naturally infect humans are chordoxpoxviruses that belong to the *Orthopoxvirus, Molluscipoxvirus*, *Parapoxvirus*, and *Yatapoxvirus* genera. Although best known for producing characteristic skin lesions, with respect to the nervous system, the most significant poxviruses are variola virus (eradicated from the wild), vaccinia virus, and monkeypox virus (all of genus *Orthopoxvirus*), and molluscum contagiosum virus (genus *Molluscipoxvirus*).

Poxvirus virions are large and complex (Fig. 2.1). They can be brick-shaped or ovoid, with lengths of 220–450 nm and widths and thicknesses of 140–260 nm. The virus genome has a condensed nucleoprotein structure in the core. In infectious intracellular mature virions, the core is surrounded by proteinaceous lateral bodies and an envelope containing non-glycosylated virus-encoded membrane proteins. Extracellular enveloped virions have a second envelope. Poxvirus genomes range in length from 135 to 375 kb of linear dsDNA and have hairpin structures at the genomic termini such that, if denatured, the genome becomes a single-stranded circle with a circumference double the genome length. Poxviruses encode ~ 200 proteins, which are expressed from unspliced transcripts that can be coded on either strand of the genome.

Poxvirus replication takes place in the cytoplasm, which is unusual among DNA viruses, and necessitates the use of a virus-encoded RNA polymerase. Virus entry is via endocytosis (Fig. 2.2, path A2) (Moss, 2012; Schmidt et al., 2012), followed by expression of early genes, some of which play roles in modulating host defenses, while others initiate subsequent steps of replication, which includes genome replication and expression of viral intermediate genes. Intermediate genes enable expression of late genes, whose translation products include virion proteins. Virion assembly takes place in specialized factories that form on cellular membranes near the nucleus. After proteolytic release of spherical immature virions from viral factories, the particles acquire their mature morphology; these virions are released by cell lysis. Some mature virions subsequently acquire a second envelope and are released by an exocytic process (Fig. 2.5, path 6).

Neurologic disease caused by poxvirus infections includes headaches that sometimes accompany the prodromal phase of infection with monkeypox virus and tanapox virus (Damon, 2011), and rare but severe encephalitis following primary vaccination with vaccinia virus (Moss, 2011). The frequency of postvaccination encephalomyelitis (PVEM) is dependent on the vaccinia strain used as the vaccine, with the strain used in the United States (New York Board of Health) being associated with relatively low PVEM incidence. PVEM develops 11–15 days after vaccination in adults and after 6–10 days in infants under 2 years of age, with symptoms consistent with demyelinating encephalomyelitis or direct infection of the CNS. CSF pressure can be elevated but cell counts and chemistry may be normal. Specific diagnosis is difficult, and vaccinia immune globulin has no proven value. The efficacy of newer antivirals (ST-246 and CMX001) is being evaluated; these drugs were used under emergency investigational new drug protocols to treat a patient with progressive vaccinia (Lederman et al., 2012).

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