

POXVIRIDAE

- ORTHOPOXVIRUS

VARIOLA MAJOR (SMALLPOX)

VARIOLA MINOR OR ALASTRIM
(SMALLPOX)

VACCINIA VIRUS

MONKEYPOX

COWPOX

SMALLPOX

- VARIOLA MAJOR (25% 33% MORTALITY)
- VARIOLA MINOR OR ALASTRIM (1% MORTALITY)

SMALLPOX

- **THE SMALLPOX WAS ALWAYS PRESENT, FILLING THE CHURCHYARDS WITH CORPSES, TORMENTING WITH CONSTANT FEARS ALL WHOM IT HAD STRICKEN, LEAVING ON THOSE WHOSE LIVES IT SPARED THE HIDEOUS TRACES OF ITS POWER, TURNING THE BABE INTO A CHANGELING AT WHICH THE MOTHER SHUDDERED, MAKING THE EYES AND CHEEKS OF THE BETROTHED MAIDEN OBJECTS OF HORROR TO THE LOVER.**

● **T.B. MACAULAY**

HISTORY OF SMALLPOX

- IT IS KNOWN FROM THE LITERATURE THAT SMALLPOX HAS BEEN AROUND FOR AT LEAST 3,000 YEARS.
- THE MUMMMIFIED REMAINS OF PHARAOH RAMSES V (1157 bc) SHOWS SIGNS OF SMALLPOX – HE WAS THE EARLIEST KNOWN VICTUM.

HISTORY OF SMALLPOX (CONT.)

- **EARLY EPIDEMICS WERE CONFINED TO THE ORIENT, THE MIDDLE EAST AND AFRICA.**
- **ARAB EXPEDITIONS CARRIED IT TO EUROPE IN THE 6th CENTURY. THERE WAS A VERY HIGH MORTALITY RATE.**
- **TRADERS LATER CARRIED IT TO THE NEW WORLD.**

HISTORY OF SMALLPOX (CONT.)

- **EXMPLES**

- IN 1707. 18,000 OF ICELANDS 50,000 PEOPLE DIED OF SMALLPOX.

- IN 1721, 883 OF BOSTONS 12,000 PEOPLE DIED OF SMALLPOX.

SMALLPOX

- IT IS SPREAD BY DROPLETS TO THE UPPER RESPIRATORY TRACT.
- THE INCUBATION PERIOD IS ABOUT 12 DAYS.
- IT MULTIPLIES IN MUCOSAL CELLS AND IS TRANSPORTED TO REGIONAL LYMPH NODES.

SMALLPOX (cont.)

- **A SHORT LIVED VIREMIA RESULTS IN ITS SPREAD TO ALL INTERNAL ORGANS.**
- **A SECOND VIREMIA OCCURS WHICH IS ASSOCIATED WITH PATHOLOGY.**
- **THERE DEVELOPS FEVER, MALAISE, HEADACHE, AND ACHES AND PAINS OVER THE WHOLE BODY.**

SMALLPOX (cont.)

- THE VIRUS SPREADS TO THE SKIN AND MULTIPLIES IN EPIDERMAL CELLS.
- MORTALITY IS RELATED TO THE AMOUNT OF VIRUS PRESENT IN THE SECOND VIREMIA. A VERY HIGH VIREMIA ALMOST ALWAYS MEANS DEATH.

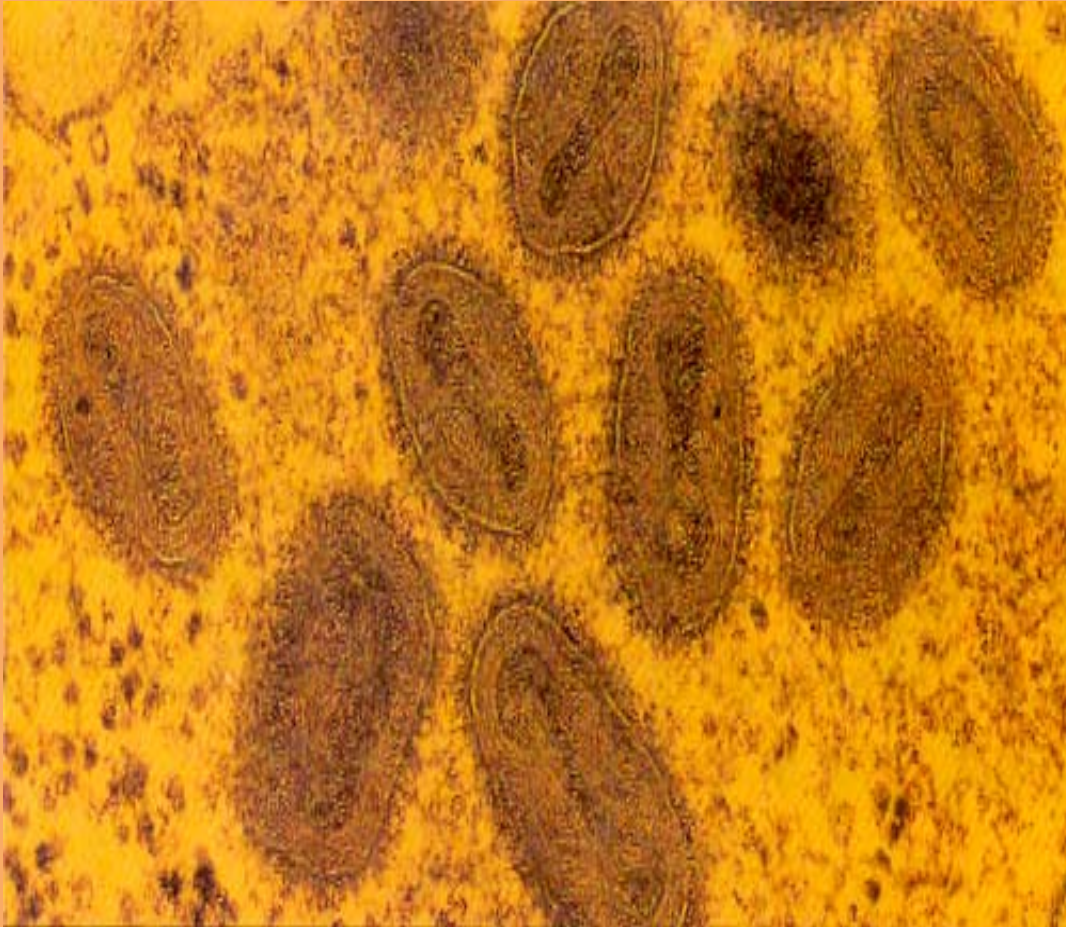
SMALLPOX

- THE LAST NATURAL CASE OF SMALLPOX OCCURRED IN MERKA, SOMALLA IN OCTOBER, 1977.
- THE LAST CASE WAS A LABORATORY ACCIDENT IN ENGLAND IN 1978. TWO PEOPLE WERE INFECTED, ONE DIED.

SMALLPOX

- THE ONLY KNOWN REMAINING STOCKS OF SMALLPOX VIRUS ARE LOCATED IN
 1. THE CENTERS FOR DISEASE CONTROL AND PREVENTION IN ATLANTA, GEORGIA. AND
 2. THE STATE RESEARCH CENTER OF VIROLOGY AND BIOTECHNOLOGY IN KOLTSOVO, RUSSIA.

MORPHOLOGY OF A COMPLEX VIRUS



- Colorized transmission electron micrograph of variola virus which causes smallpox

CUTANEOUS MANIFESTATIONS OF SMALLPOX (VARIOLA)



- Smallpox: in contrast to those of chickenpox, the lesions are larger and less superficial. This is a mild attack of smallpox.

CUTANEOUS MANIFESTATIONS OF SMALLPOX (VARIOLA)



- Smallpox (variola): severe form showing peripheral distribution of vesicular pustular rash.

CUTANEOUS MANIFESTATIONS OF SMALLPOX (VARIOLA)



- Child with smallpox. Note the characteristic rash.

CUTANEOUS MANIFESTATIONS OF SMALLPOX (VARIOLA)



- **These pictures were used as smallpox recognition cards by the World HEALTH ORGANIZATION**

REASONS WHY SMALLPOX WAS A GOOD CANDIDATE FOR GLOBAL ERADICATION

- 1. THERE IS NO ANIMAL RESERVOIR.
- 2. THERE IS NO LATENT INFECTION.
- 3. THERE IS NO CARRIER STATE.
- 4. THERE IS ANTIGENIC STABILITY (IT DOES NOT MUTATE)
- 5. THERE IS AN EFFECTIVE VACCINE.

HISTORY OF SMALLPOX VACCINATION

- **ANCIENT CHINA – POWDERED SCABS**
- **INDIA – SCABS**
- **“VARIOLATION”**
 - LADY MARY WORTLEY MONTAGUE (1717)**
 - DR. CHARLES MAITLAND**
- **VACCINATION (1796)**
 - **DR. EDWARD JENNER**
 - SARAH NELMES**
 - JAMES PHIPPS**

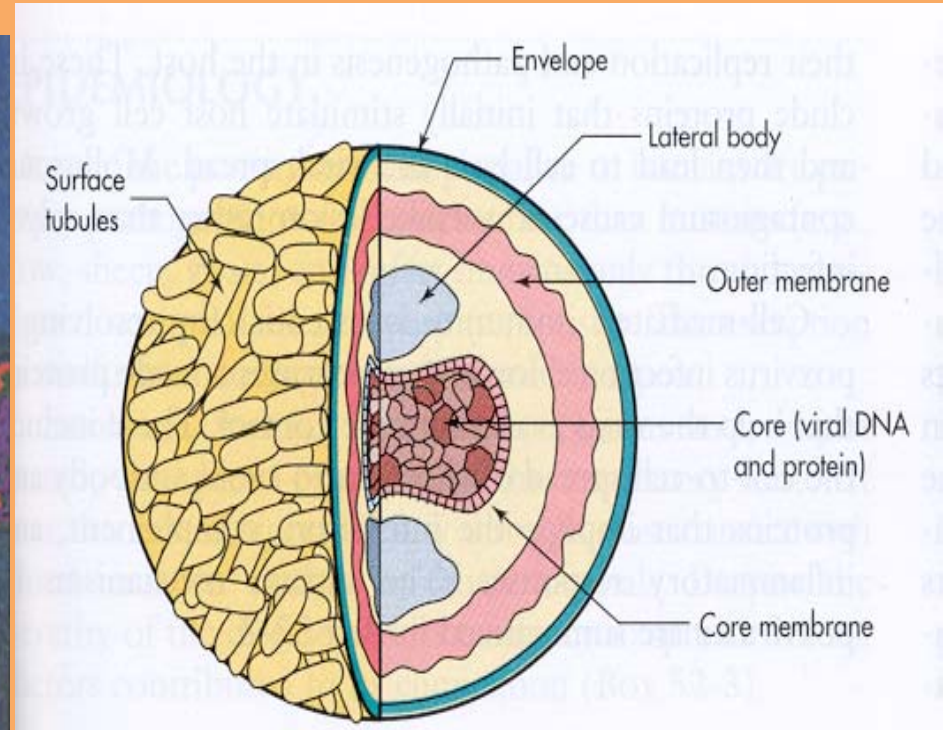
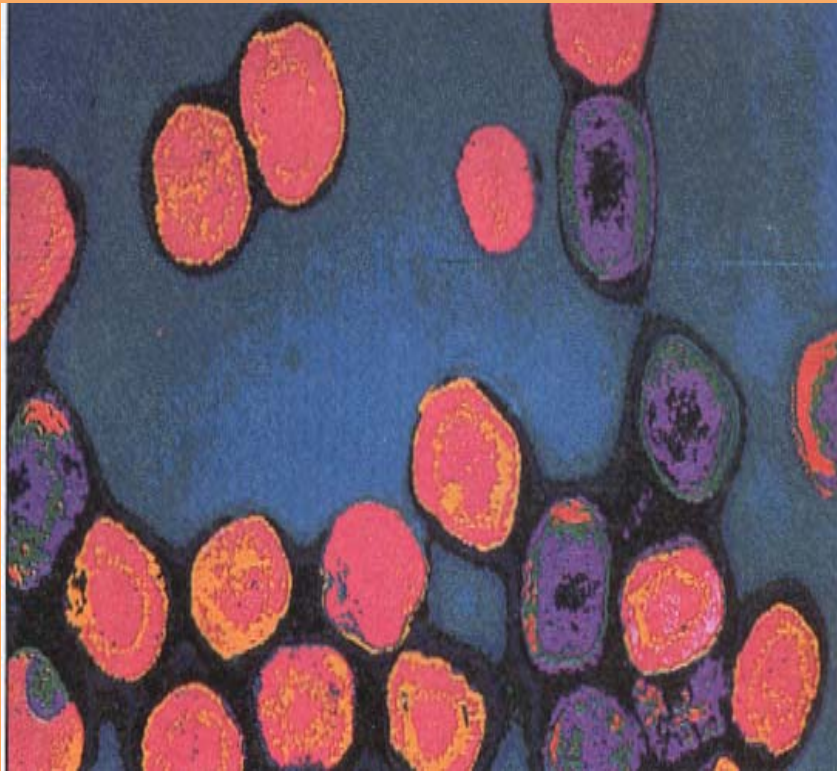
VACCINIA VIRUS

- IT SHOULD BE COWPOX VIRUS BUT IT ISN'T. IT IS A VERY DIFFERENT VIRUS.
- IT IS NOW BELIEVED, ON THE BASIS OF ITS ANTIGENIC STRUCTURE, THAT THE COWPOX VACCINE VIRUS WAS INADVERTENTLY REPLACED WITH AN ATTENUATED SMALLPOX VIRUS.

VACCINIA VIRUS (CONT.)

- THE VACCINE IS PREPARED FROM SCRAPINGS OF VACCINAL LESIONS ON THE SKIN OF CALVES OR SHEEP.
- IT IS A LIVE VIRUS VACCINE.
- 1% PHENOL IS ADDED TO KILL CONTAMINATING BACTERIA.

VACCINIA VIRUS (POXVIRUS)



- **Colorized transmission electron micrograph and figure of vaccinia virus.**