Viral Gastroenteritis (VG)

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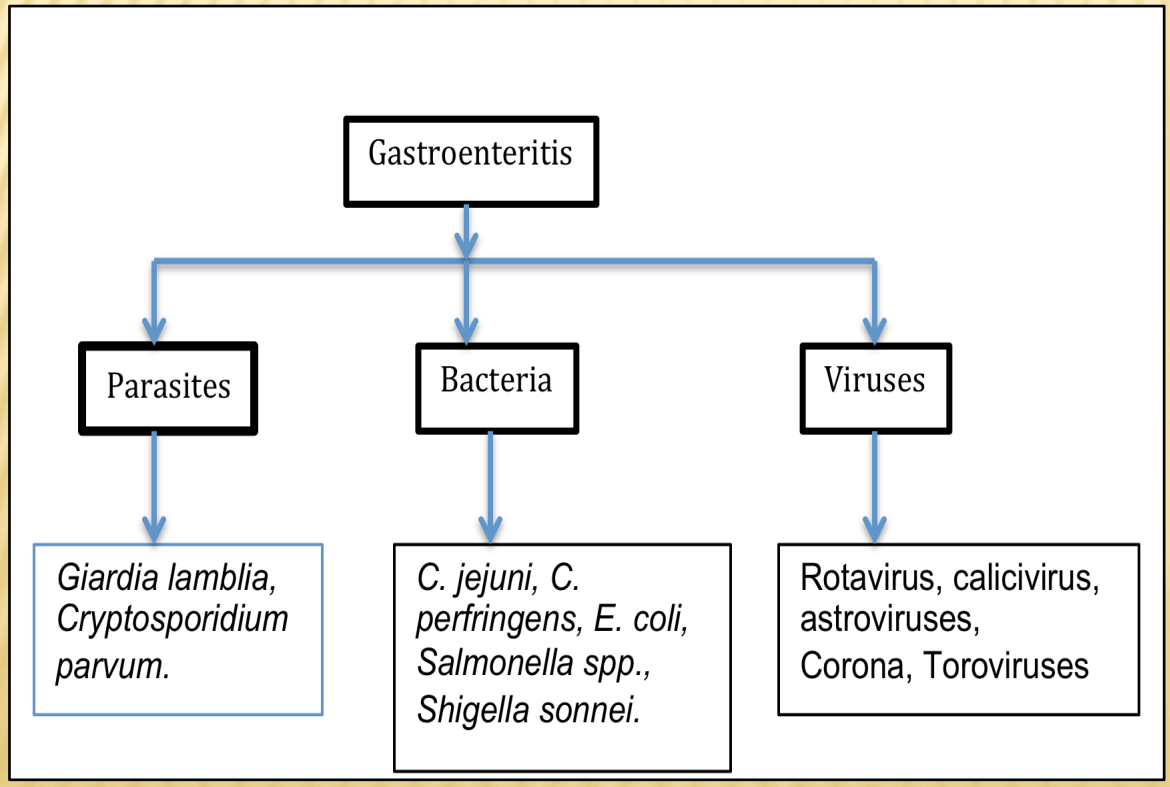
INTRODUCTION

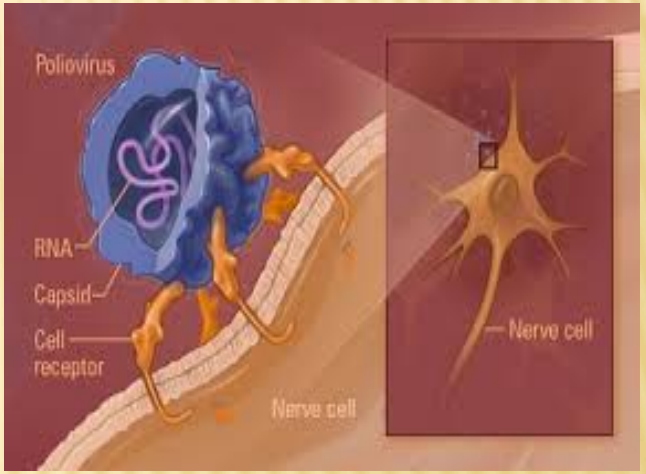
Gastroenteritis is defined as Vomiting or diarrhea due to infections of the stomach, small and large intestine.

CAUSES



Viruses found in the gut and not associated with gastroenteritis.

- Poliovirus
- Coxsackie A and B virus
- Enteroviruses 68-71 virus
- Hepatitis A virus.
- Hepatitis E virus.
- Adenoviruses 1-39 viruses
- Reoviruses.



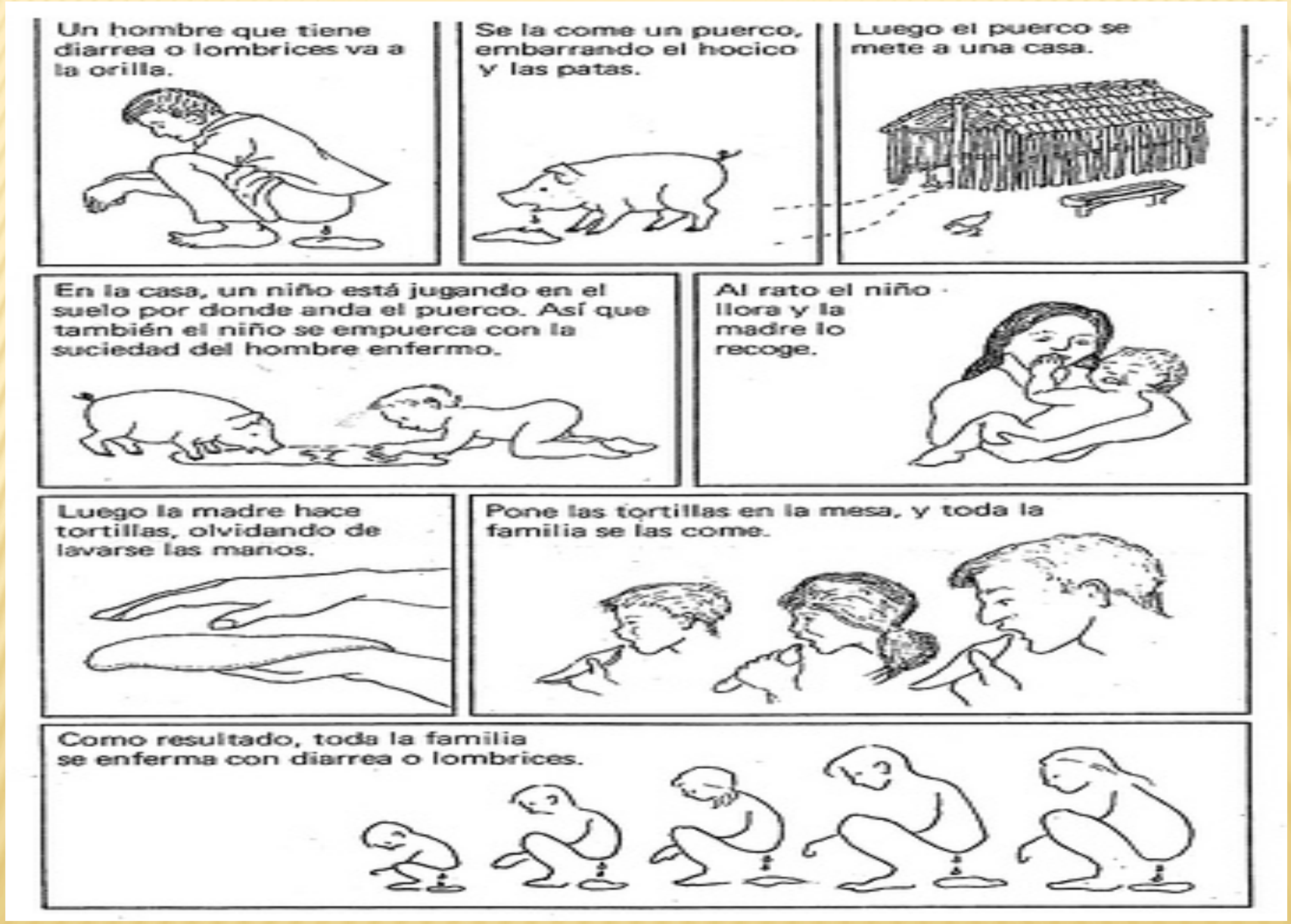
Viruses found in the gut Associated with gastroenteritis

- Rotaviruses
- Adenoviruses 40/41
- Caliciviruses
- Noroviruses
- Astroviruses
- Coronaviruses

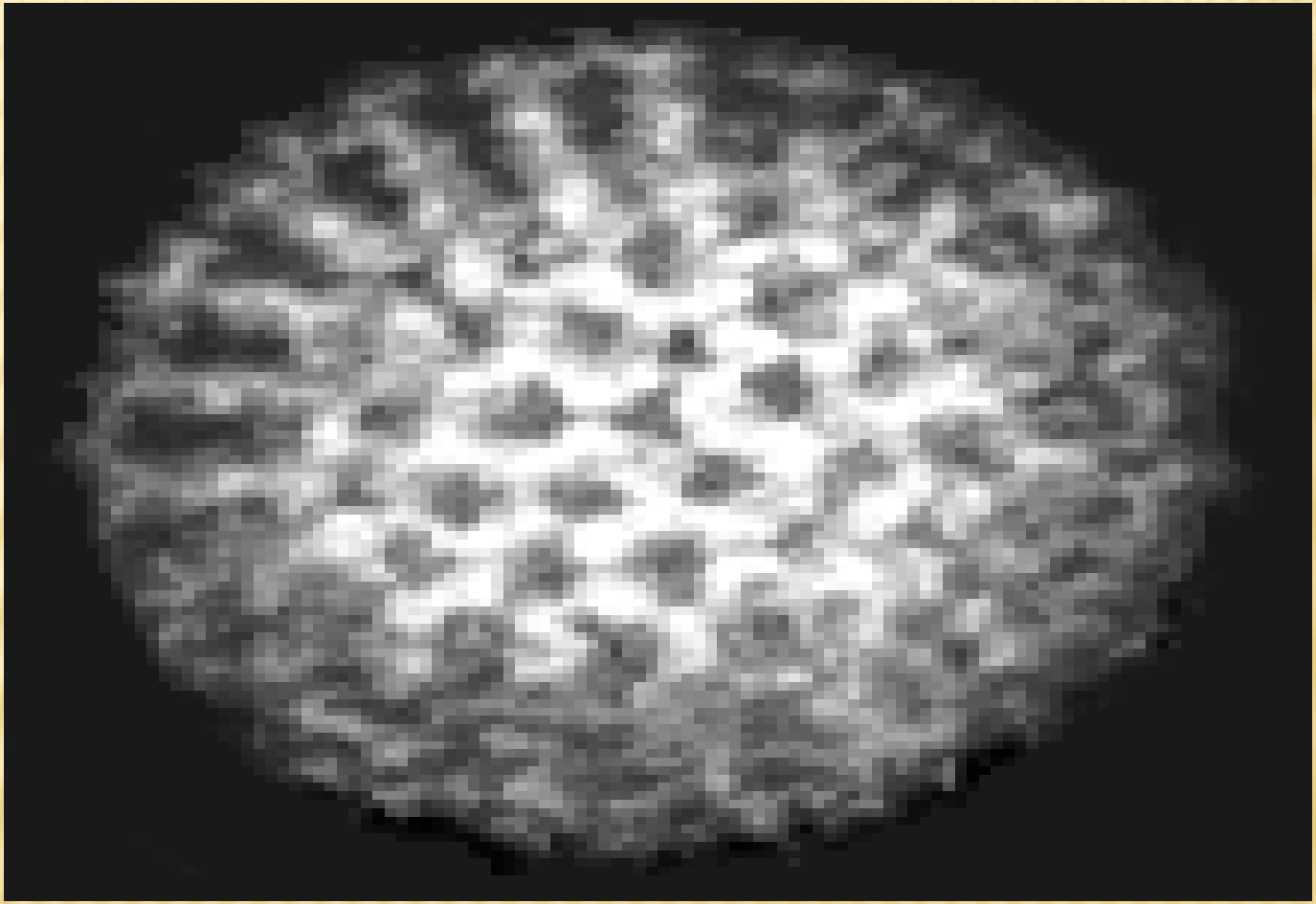
Epidemiology.

- Viruses are responsible for up to 3/4 of all infective diarrhoeas.
- VG is the second most common viral illness after upper respiratory tract infection.
- In developing countries, viral gastroenteritis is a major killer of infants.

Transmission: Fecal-oral



Rotavirus



(Courtesy of Linda Stannard, University of Cape Town, S.A.)

Importance of Rotaviruses

- Rotaviruses are major cause of diarrheal illness in infants in the world.
- Adults too can get infected.
- Young animals, calves, piglets can also infected.

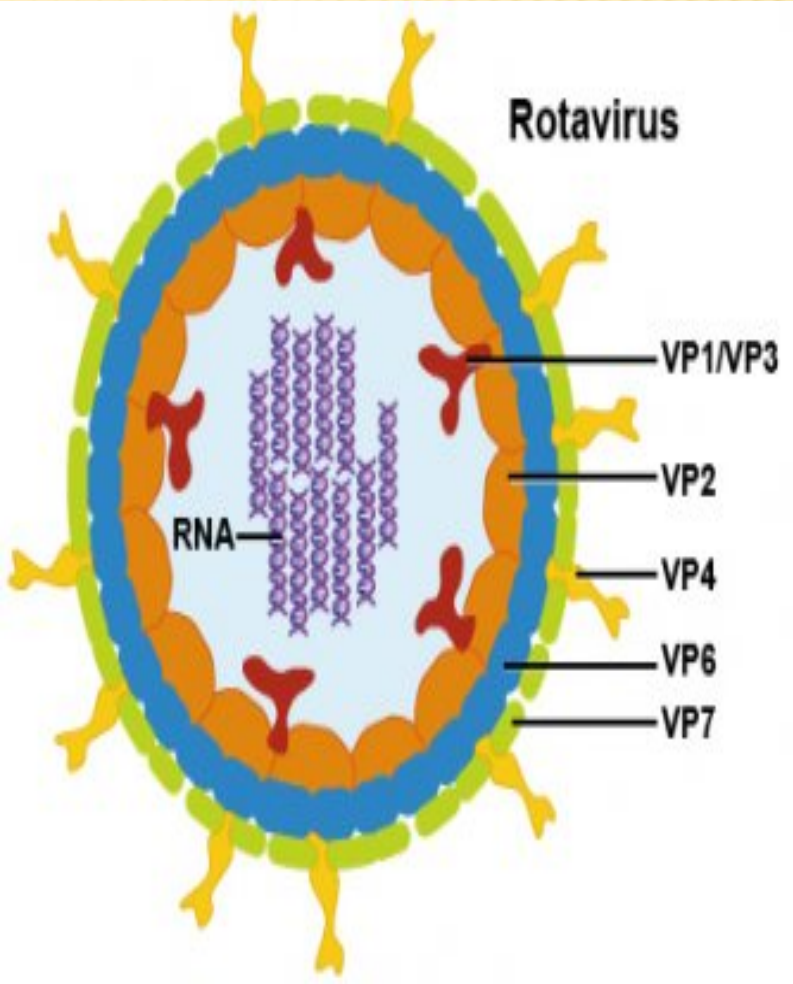
Classification of Rotaviruses

- They belong to Reoviridae family.
- RV are classified as Five species (A- E).
- Group A is important human pathogen Outer capsid protein VP4 and VP7 carry epitopes important in neutralizing antibodies.

Characters of Rotavirus

- Rotaviruses are non enveloped, double-shelled viruses.

- The genome is composed of 11 segments of double-stranded RNA, which code for six structural and five non-structural proteins.



TRANSMISSION

- Fecal-oral route
- High numbers of viral particles are shed in diarrheal stools (1010/gm).

CLINICAL SYMPTOMS

Incubation period is 1 – 3 days

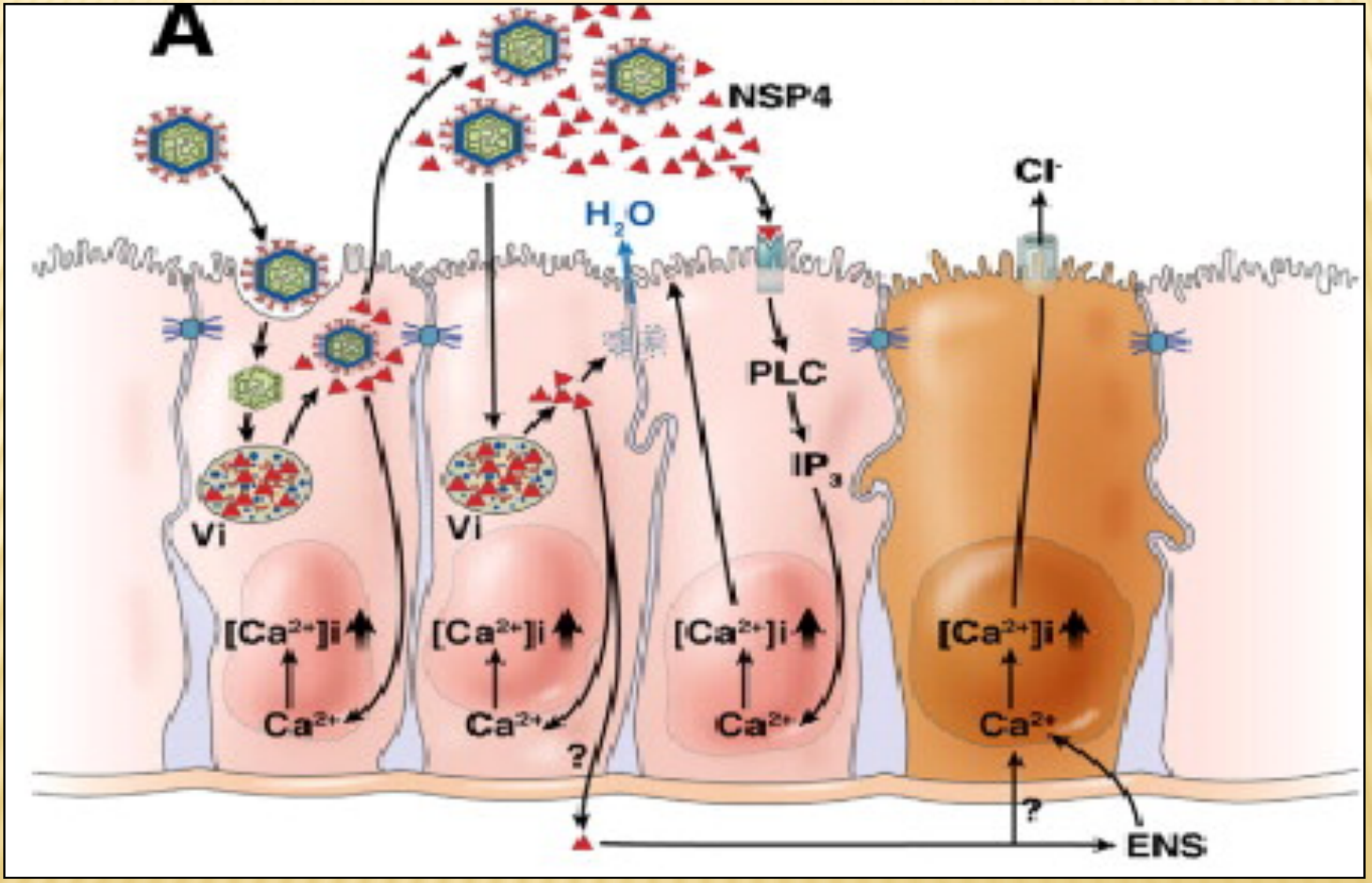
Diarrhea
Vomiting
Dehydration
Shock
Death

Patients with milder disease recovers promptly in 3 – 8 days .

Pathogenesis

- The virus infect the villi of the small intestine.
- They multiply in the enterocytes and damage their transport mechanisms.
- The RV particle NSP4 is a viral enterotoxin.
- Damaged cell may show into lumen of the intestinal and release large quantities of virus which appear in the stool.
- Viral excretion usually lasts for 2 – 12 days in otherwise healthy patients

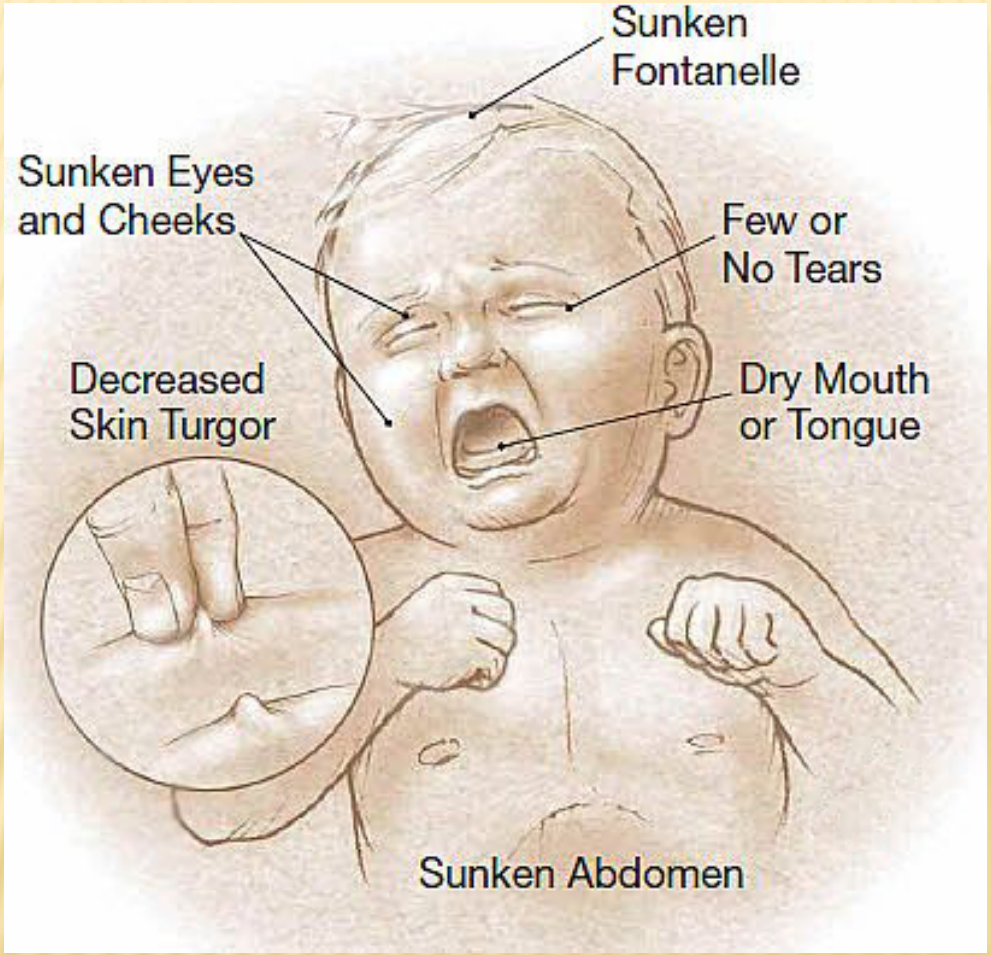
Pathogenesis



Why Diarrhea in Rota viral Infections

Diarrhoea caused by Rotaviruses may be due to impaired sodium and glucose absorption as damaged cell on villi are replaced by non absorbing immature crypt cell.

Dehydration is leading cause in Morbidity and Mortality



Immunity in Rota viral Infections

- By age 3 years, 90% of the children have serum antibodies to one or more types.
- Young children suffer upto to five re-infections by 2 years of age.
- Secretary IgA or Interferon are important in protection against Rota viral infections.

LABORATORY DIAGNOSIS

Detection of rotavirus in the stool by:

- ELISA
- Latex agglutination
- PCR

Treatment

- Treatment of Gastroenteritis is supportive.
- Correction of Loss of water and electrolytes Failure for prompt correction of dehydration leads to Acidosis Shock Death.
- Correction Electrolyte remain the goal treatment in Rota viral infections.

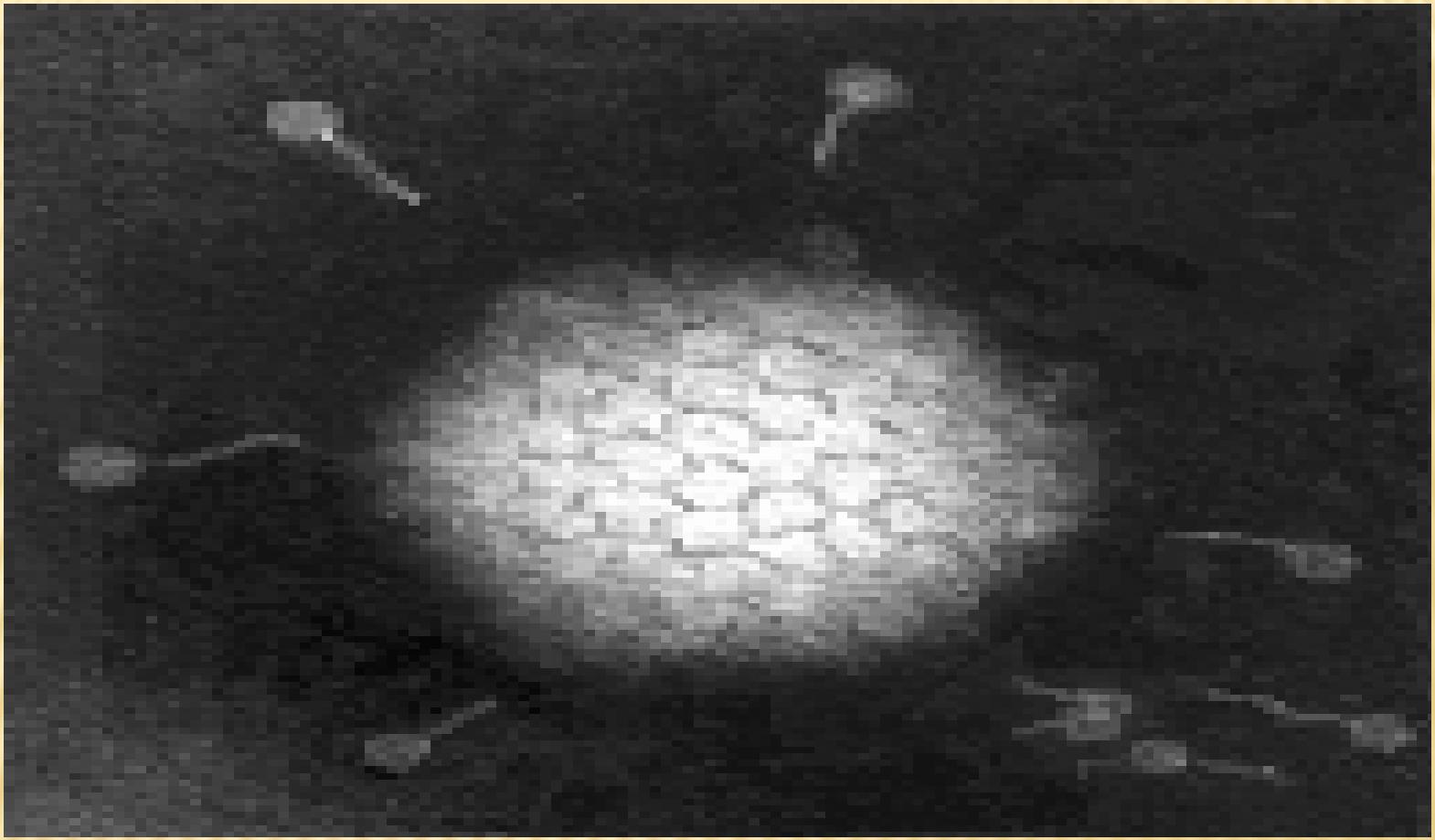
Prevention and Control

- In view of fecal oral route of transmission waste water management, safe water supplies and sanitation are significant control measurers.
- Vaccine – In 2006 an Oral Bovine based Rota viral vaccine was licensed in USA.

- ADENOVIRUS 40 AND 41
- ASTROVIRUS
- CALICIVIRUS
- NOROVIRUS

END

ADENOVIRUS PARTICLE

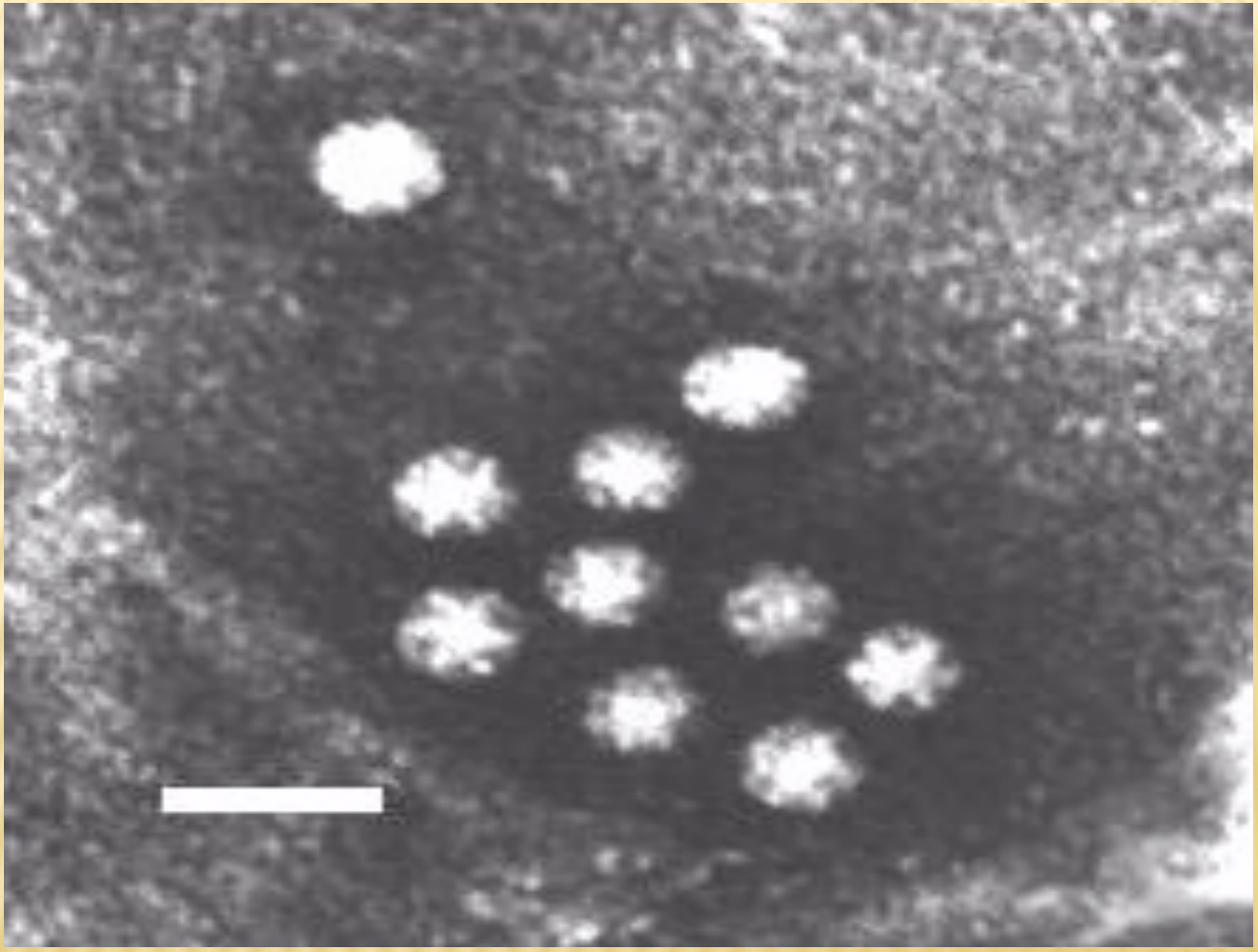


(Courtesy of Linda Stannard, University of Cape Town, S.A.)

ENTERIC ADENOVIRUSES

- Adenovirus types 40 and 41 are members of Adenoviridae family. Are naked DNA viruses.
- Are associated with gastroenteritis.
- Associated with cases of endemic gastroenteritis, usually in young children and neonates.
- Possibly the second most common viral cause of gastroenteritis.
- Similar disease to rotaviruses
- Most people have antibodies against enteric adenoviruses by the age of three.
- Diagnosed by electron microscopy or by the detection of adenovirus antigens in faeces by ELISA or other assays.

ASTROVIRUS PARTICLES



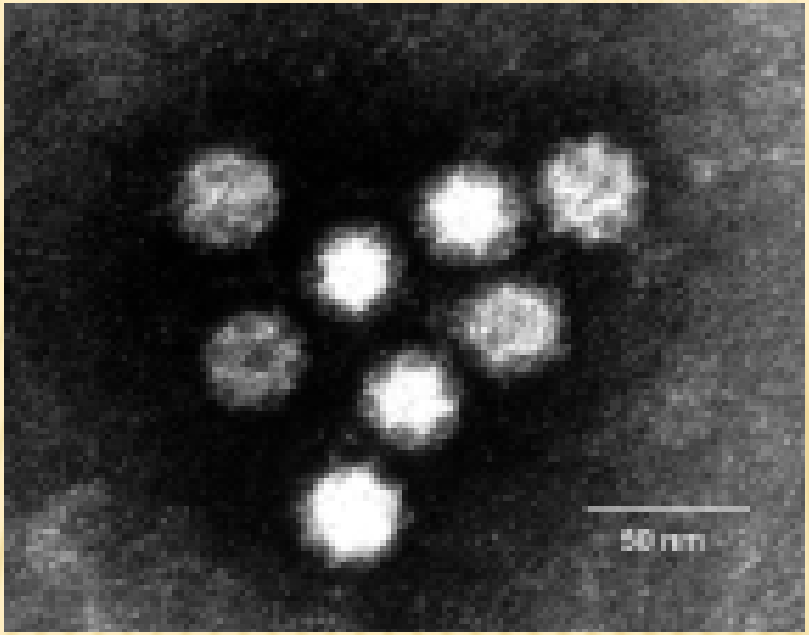
(Source: ICTV database)

ASTROVIRUSES

- Members of Astroviridae family.
- Small RNA viruses, named because of star-shaped surface morphology, 28 nm in diameter.
- Associated with cases of endemic gastroenteritis, usually in young children and neonates. Can cause occasional outbreaks.
- Responsible for up to 10% of cases of gastroenteritis.
- Similar disease to rota and adenoviruses.
- Incubation period is 1-4days followed by watery diarrhea lasting for 1-4 days.
- Abdominal discomfort, vomiting are common symptoms.

- Most people have antibodies by the age of three.
- Immunity last for years.
- Diagnosed by ELISA

CALICIVIRUS PARTICLES

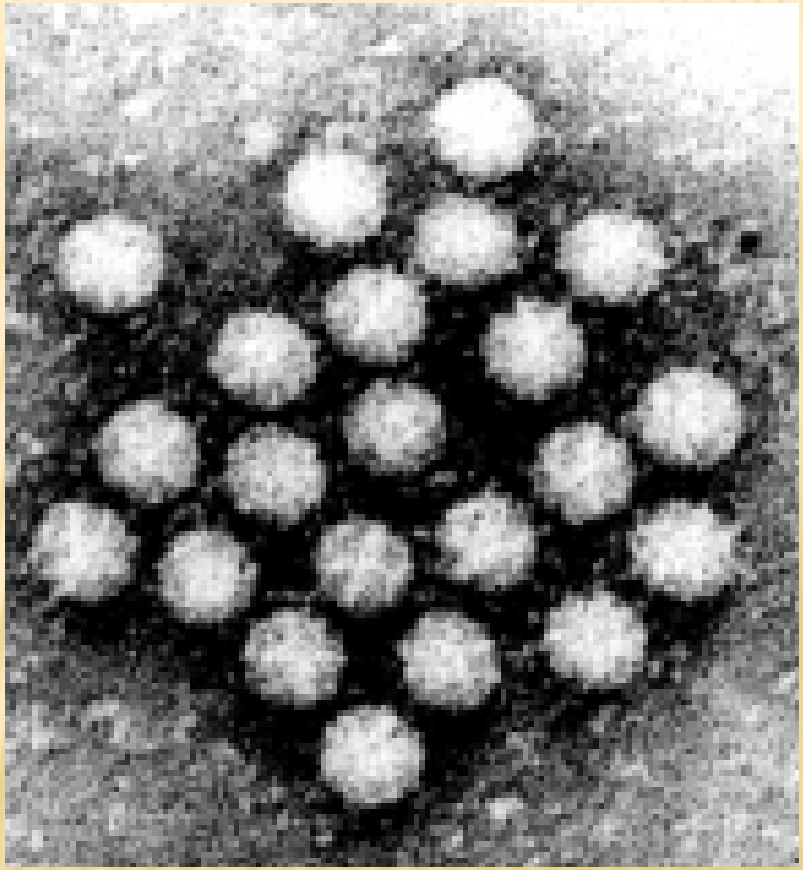


(Source: ICTV database)

CALICIVIRUSES

- Small RNA viruses, characteristic surface morphology consisting of hollows. particles 35 nm in diameter.
- Associated mainly with epidemic outbreaks of gastroenteritis, although occasionally responsible for endemic cases.
- Like Norwalk type viruses, vomiting is the prominent feature of disease.
- Majority of children have antibodies against caliciviruses by the age of three.
- Diagnosed by electron microscopy only, often difficult to diagnose because of small size.

NORWALK-LIKE VIRUS PARTICLES



NORWALK-LIKE VIRUSES

- Small RNA viruses now classified as caliciviruses.
- Always associated with epidemic outbreaks of gastroenteritis, adults more commonly affected than children.
- Associated with consumption of shellfish and other contaminated foods. Aerosol spread possible as well as faecal-oral spread.
- Also named "winter vomiting disease", with vomiting being the prominent symptom, diarrhoea usually mild.
- Antibodies acquired later in life, in the US, only 50% of adults are seropositive by the age of 50.
- Diagnosis is made by electron microscopy and by PCR.

END