

# Lecture 7



## Viral gastroenteritis

- Additional Notes
- Important
- Explanation
- Examples

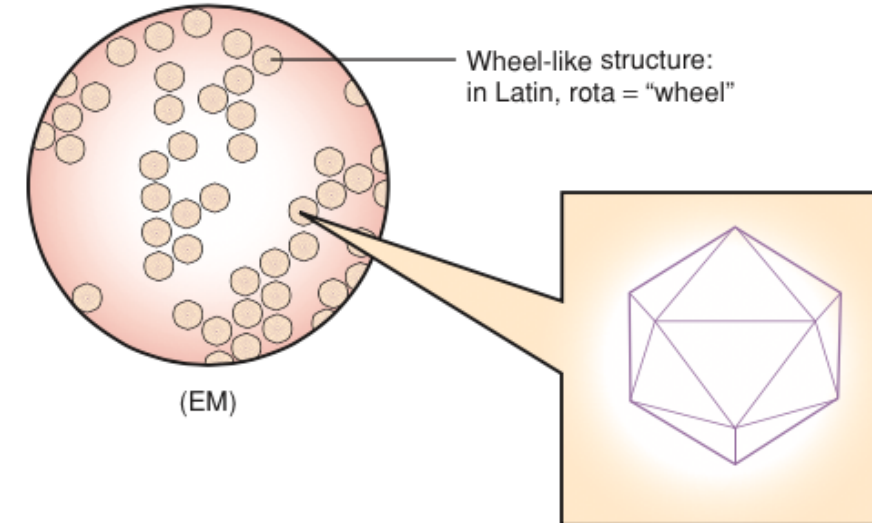
# Introduction:

- Viral gastroenteritis: is an inflammation of stomach and intestine caused by either:
  - ✓ Non-infectious agents
  - ✓ Infectious agents (most commonly **viral**)
- Most common infected age group: infants & young children, in winter season.
- Endemic infection: mainly children by (gp.A rotavirus)
- Epidemic infection: adults by Norovirus
- Incubation period is short > 1-2 days
- Symptoms: **secretory diarrhea**, vomiting, low grade fever & abdominal cramps
- **Complication: Dehydration** → life threatening specially in malnutrition children
- Transmission through fecal-oral route
- **Diagnosis is based on clinical appearance and identification of Ag by ELISA.**
- Outcomes vary:
  - ✓ In developed countries: mortality is low
  - ✓ In developing countries: mortality is high

- Lab diagnosis:
  - ✓ ELISA MOST USED Specific & sensitive Detect viral antigen
  - ✓ Cell culture [c/c]: Not used because these viruses are fastidious organisms & they're growing poorly.
  - ✓ Electron microscopy Not used, It is specific but not sensitive
  - ✓ (ICT): immunochromatography therapy
  - ✓ Latex agglutination
  - ✓ Gel electrophoresis
- Treatment:
  - ✓ Rehydration
  - ✓ Hygiene measures
  - ✓ Sanitation
- **Vaccine:** Only for Rotavirus
  - ✓ Rotarix: Oral, Live-attenuated, For infants.
  - ✓ RotaTeq: Oral, Live-attenuated.

# Rotavirus

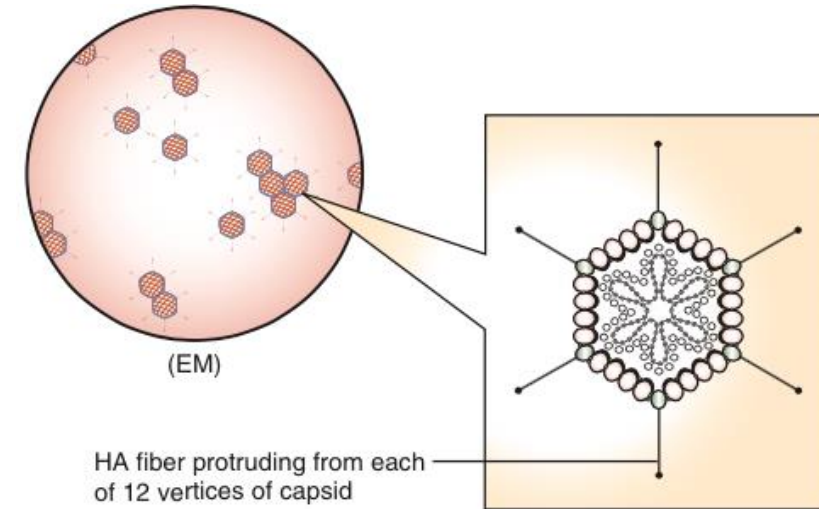
- Non-enveloped, Double-layered icosahedral capsid, with 11 segments ds-RNA, IP = 1-2 days
  - ✓ 7 groups [A-G] ---- GpA → most common
- Transmitted via fecal-oral route → infects villus cells of proximal small intestine → replicates within and lyses cell → impaired absorption of carbohydrates & nutrients.
- Watery, non-bloody diarrhea, vomiting, fever & Dehydration.
- Infants & young children → GE
- Older children + adults → asymptomatic
- Low Immune hosts → chronic diarrhea
- May cause encephalitis → small number of cases.
- Diagnosis: stool specimen
  - ✓ immunoassay for virus “Most used”
    - ELISA , ICT& latex agglutination
- Treatment: Rehydration.
- Prevention: rotavirus vaccine (live oral attenuated)



• Genome has 11 segments of dsRNA, allowing for frequent gene reassortment

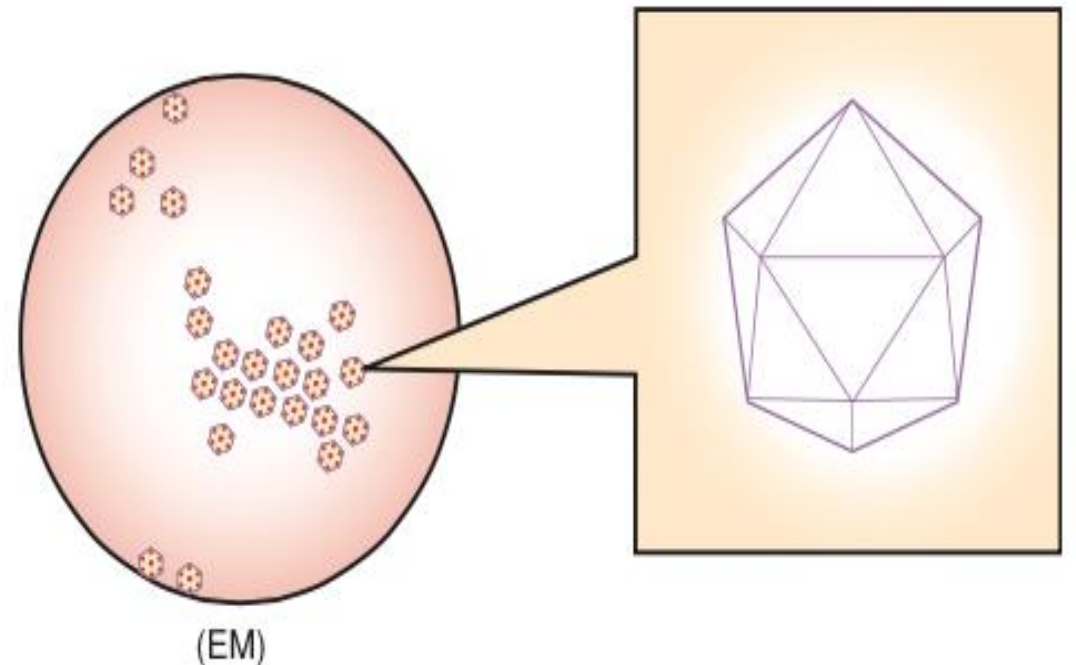
# Enteric Adenoviruses

- **Non-enveloped, icosahedral capsid, ds-DNA**
  - ✓ Only V with a fiber protruding from each of the vertices of the capsid
- Adenoviruses that cause gastroenteritis are subgenus (F), 40 & 41 serotypes
- Spread by aerosol, fecal–oral route, or direct contact → binds via hemagglutinin → enters and lyses mucosal cells of gastrointestinal tract in young children → gastroenteritis with non-bloody diarrhea
- **Diagnosis:**
  - ✓ Ag detection in stool samples by ELISA or Immunochromatography Tech.
  - ✓ isolation of virus in cell culture



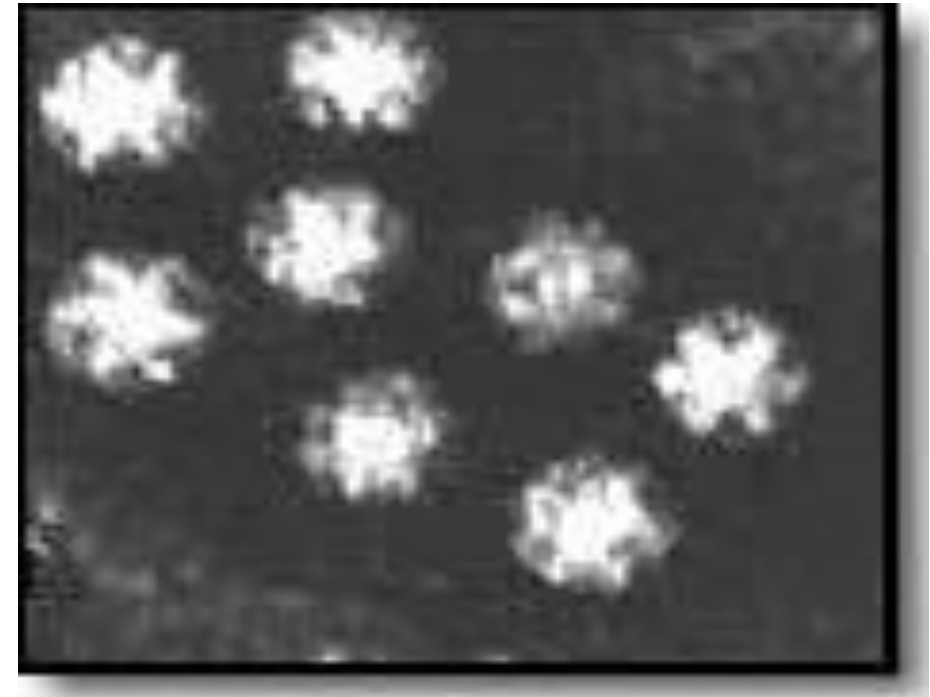
# Caliciviruses (Noroviruses)

- Non-enveloped, Icosahedral capsid, ss-RNA with +ve polarity.
- There is 2 types of this virus:
  - ✓ Typical caliciviruses (Sapoviruses) → causes acute hepatitis.
  - ✓ Small Rounded Structured Viruses (Noroviruses) → causes GE
- Transmitted by contact or contaminated food/water → local infection and inflammation in proximal small intestine → gastroenteritis
- Children → vomiting [projectile]
- Adults → diarrhea
- Diagnosis: Viral Ag in stool samples by ELISA



# Astroviruses

- Non-enveloped, Icosahedral capsid, ss-RNA with +ve polarity, with 8 serotypes.
- Mild GE
- Outbreak of diarrhea <5 ys.
- Lab Diagnosis: Ag detection in stool by ELISA



Agent	Rotavirus	Adenovirus	Calicivirus "Norovirus"	Astrovirus
Description	non-enveloped, <b>dsRNA</b> Icosahedral, double layer capsule, 11-segmented genome <b>most common serotype: gp.A</b>	non-enveloped, <b>dsDNA</b> , Icosahedral, fibers on capsid <b>most common serotype: 40 &amp; 41</b>	Non-enveloped, <b>ssRNA</b> Icosahedral capsid +ve polarity	Non-enveloped, <b>ssRNA</b> Icosahedral capsid +ve polarity
Clinical feature	IP: 1-2 days Watery non-bloody diarrhea, vomiting & low grade fever May cause Encephalitis	Less sever and cause prolonged illness	Children: mainly Vomiting Adults: Diarrhea	Mild GE
Diagnosis	stool specimen immunoassay for virus "Most used" → ELISA , ICT& latex agglutination	Ag detection in stool samples by ELISA or Immunochromatography Tech.  isolation of virus in cell culture	Viral Ag in stool samples by ELISA	Ag detection in stool by ELISA
notes	<b>Prevention: rotavirus vaccine (Oral live-attenuated)</b>			



# Quiz

1. Which type of vaccine we use in Rotaviruses?

- a) Live attenuated    b) Inactivated    c) Toxoid    d) Conjugate

2. What is the most common way to diagnose viral GE:

- a) Viral DNA detection by ELISA    b) Cell culture    c) Ag detection in stool by ELISA

3. Common serotypes that cause GE in adenovirus is:

- a) 40 & 43    b) 40 & 41    c) 41 & 42    d) 40, 41 & 44

4. Both of these viruses have ssRNA genome:

- a) Rotavirus, Adenovirus    b) Rotavirus, Calcivirus    c) Astrovirus, Calcivirus

# Quiz

5. The most proper way to manage viral GE is:

- a) Vaccination    b) Antiviral agent    c) Rehydration    d) Antibiotic

6. A man who went on a cruise and ate shellfish, after 1 day he presented with diarrhea. The morphology tests showed ssRNA, small rounded structured viruses. Which of the following is the most likely causative virus?

- a) Rotavirus    b) Adenovirus    c) Norovirus    d) Astrovirus

7. The most common viral ENDEMIC cause of GE among infants and young children is :

- a) Rotavirus    b) Calcivirus    c) Astrovirus    d) Adenovirus