Professor Dr. Mothana Ali Khalil. Medical Virology

PICORANAVARIDAE

picornavaridae

Pico = small

rna = RNA

Classification of picornaviruses

Genus	Group	Serotypes
1- Enterovirus	Polioviruses	1 – 3
	Coxsacki Viruses (A)	1 – 24 No23
	Coxsacki Viruses (B)	1 – 6
	Echoviruses	1 – 33 No10,22
	Enteroviruses	68 – 71
	Hepatitis A Virus (1972)	

Acid stable

Donot produce enteritis but multiply in Gut

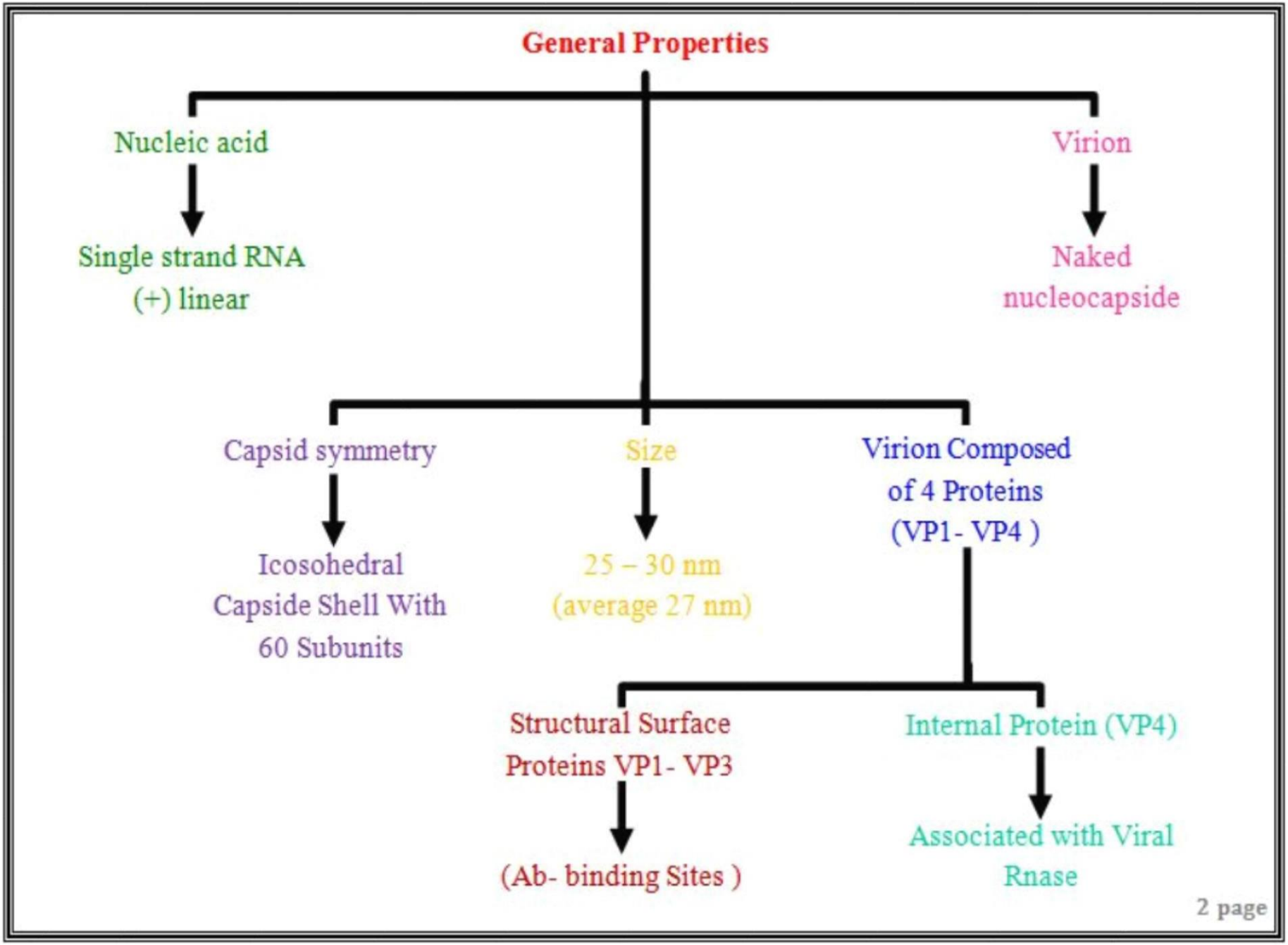
2- Hepatovirus

3- Rhinovirus

acid stable

multiply in URT

4-Animal Viruses → Cause Food and mouth disease in animals


General Properties
Nucleic acid
Single strand RNA
(+) linear
Virion
Naked
nucleocapside
Capsid symmetry
Icosohedral
Capside Shell With
60 Subunits
Size
25 – 30 nm
(average 27 nm)
Virion Composed
of 4 Proteins
(VP1- VP4)
Structural Surface
Proteins VP1- VP3
(Ab- binding Sites)
Internal Protein (VP4)
Associated with Viral
Rnase

Poliovirus

Is responsible For an acute infectious disease that occasionally involves the (CNS) infection and destruction of the motor neurons in the Spinal Cord may Lead to Flaccid Paralysis

Pathogenesis

Most Poliovirus infection are Subclinical

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Virus also spread along nerve axon of peripheral nerves

to

CNS

Continues to Progress along the Fiber of Lower motor neuron to involve of Spinal Cord or Brain

In CNS

Virus replication in Lower motor neuron Located in anterior horn of Spinal Cord

Lead to

Death of the Cell

results in

Paralysis of muscles innervated by these cell

Virus also affects brain stem

Leading to

Bulbar Poliomyelitis with Respiratory Paralysis

Virus replicated in oropharynx

Small intestine also replicated especially in Lymph nodes(pyres patches of small intestine)

Blood stream

CNS

Pathogenesis

Paralytic poliomyelitis, Flaccid paralysis is predominant

↓ resulting From

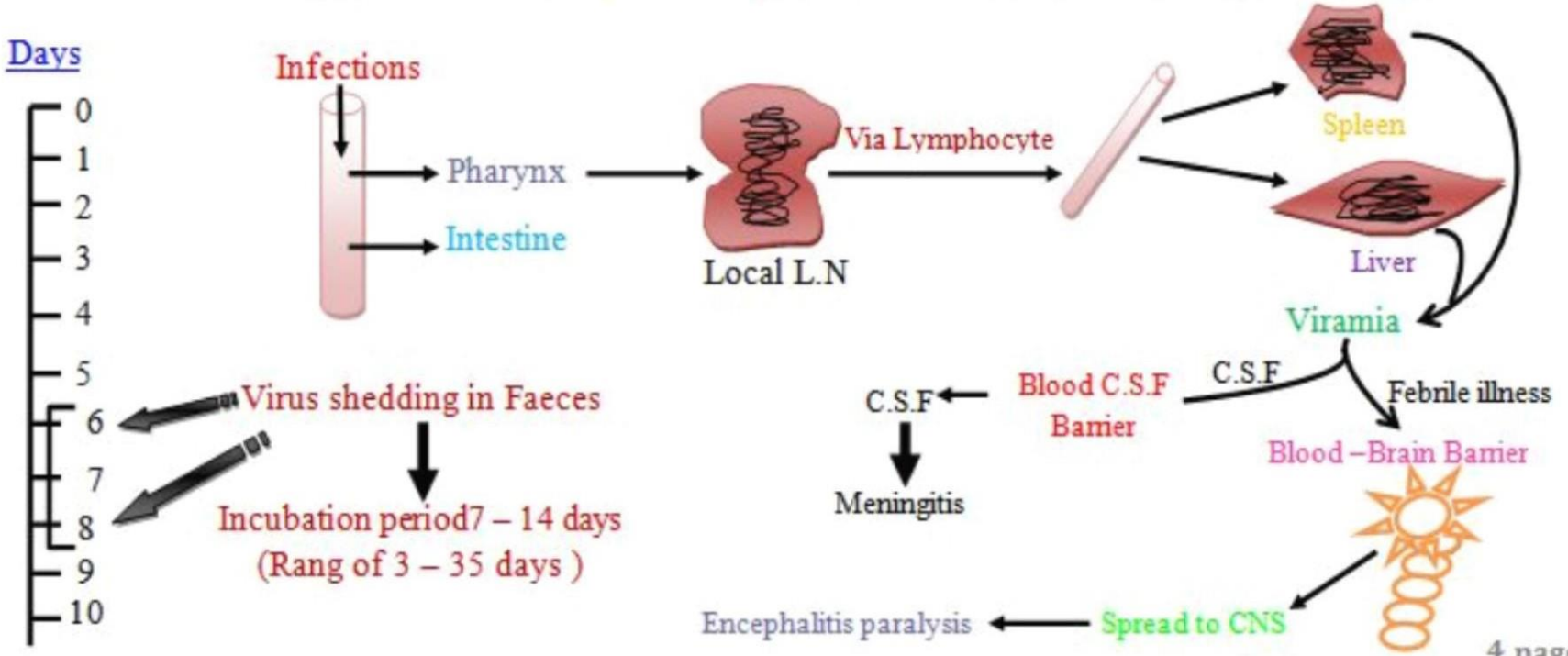
Lower motor Neuron damage

muscle involvement is usually maximal within a Few days after paralytic phase begins .

Maximal recovery usually occurs within 6 months ,with residual paralysis Lasting much Longer

The probability of involvement of C.S.F depending on certain Factor.

Age | Pregnancy | Tonsillitis | Fatigue | Absence of antibodies

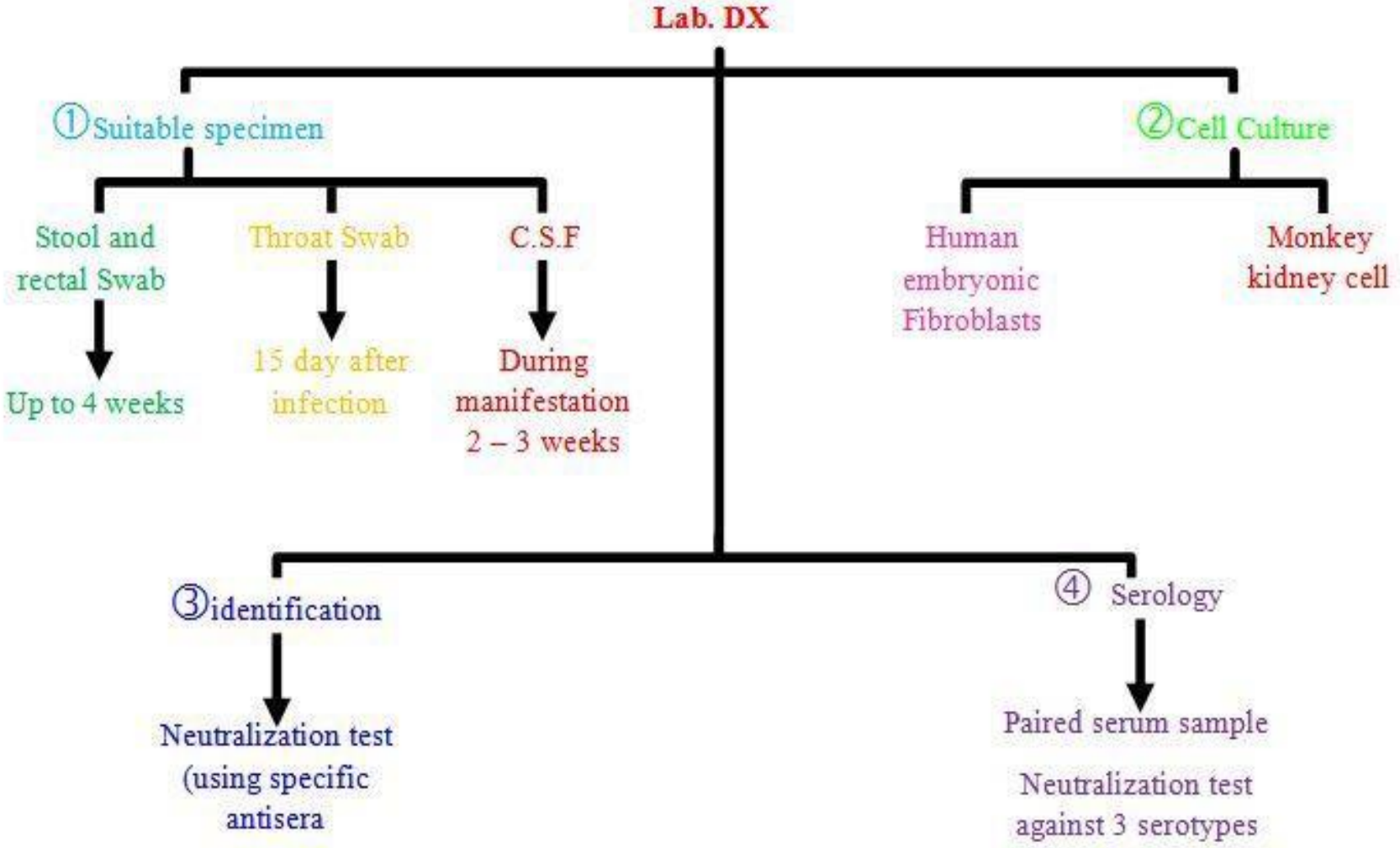


Clinical Features

either

- In apparent infection 90 – 95 %
  - No clinical Features
    Virus in stool or throat or both
- Abortive or minor illness 4 – 8 %
  - Symptoms or respiratory or infection
  - Virus present in stool

- Non – paralytic poliomyelitis (Aseptic meningitis) 1 – 2 %
  - Stiffness and pain in back and neck 2- 10 days , rapid recovery
- Paralytic poliomyelitis 0.1- 2 %
  - Flaccid paralysis (Lower motor neuron damage)
- Progressive post poliomyelitis muscle atrophy
  - Physiological and aging change ; paralytic poliomyelitis (Loss of neuromuscular Functions)


Lab. DX
①Suitable specimen
②Cell Culture
Stool and rectal Swab
Throat Swab
C.S.F
Human embryonic Fibroblasts
Monkey kidney cell
Up to 4 weeks
15 day after infection
During manifestation 2 – 3 weeks
③identification
④ Serology
Neutralization test (using specific antisera
Paired serum sample
Neutralization test against 3 serotypes

Prevention

1. live attenuated vaccine

Live polio vaccine (LPV) or Oral polio vaccine (OPV) or Sabin vaccine (monkey kidney or human diploid cell)

With stabilizer agent such as Mg cl2

Trivalent 1, 2, 3

Programs

2+4 month of age

6 – 18 month of

Before school entry (4 – 6 years)

Make the OPV or LPV to be kept without Losing Potency For year at 4 c° And For weeks at moderate room temp ~ 25 c°.

Wherease

non stabilized Vaccine must be kept Frozen until used

so

during vaccination policy using ice Box

2. killed vaccine or inactivated Virus Vaccine (K P V or I P V) or Salk vaccine (Monkey Kidney Culture)

Vaccination programs

2 , 4 month

12 , 18 month

before school entry (4 – 6 years)

تكملة الصفحة السابقة **Prevention**

3 Recombinant DNA using

Live polio mutant to neurovirulence

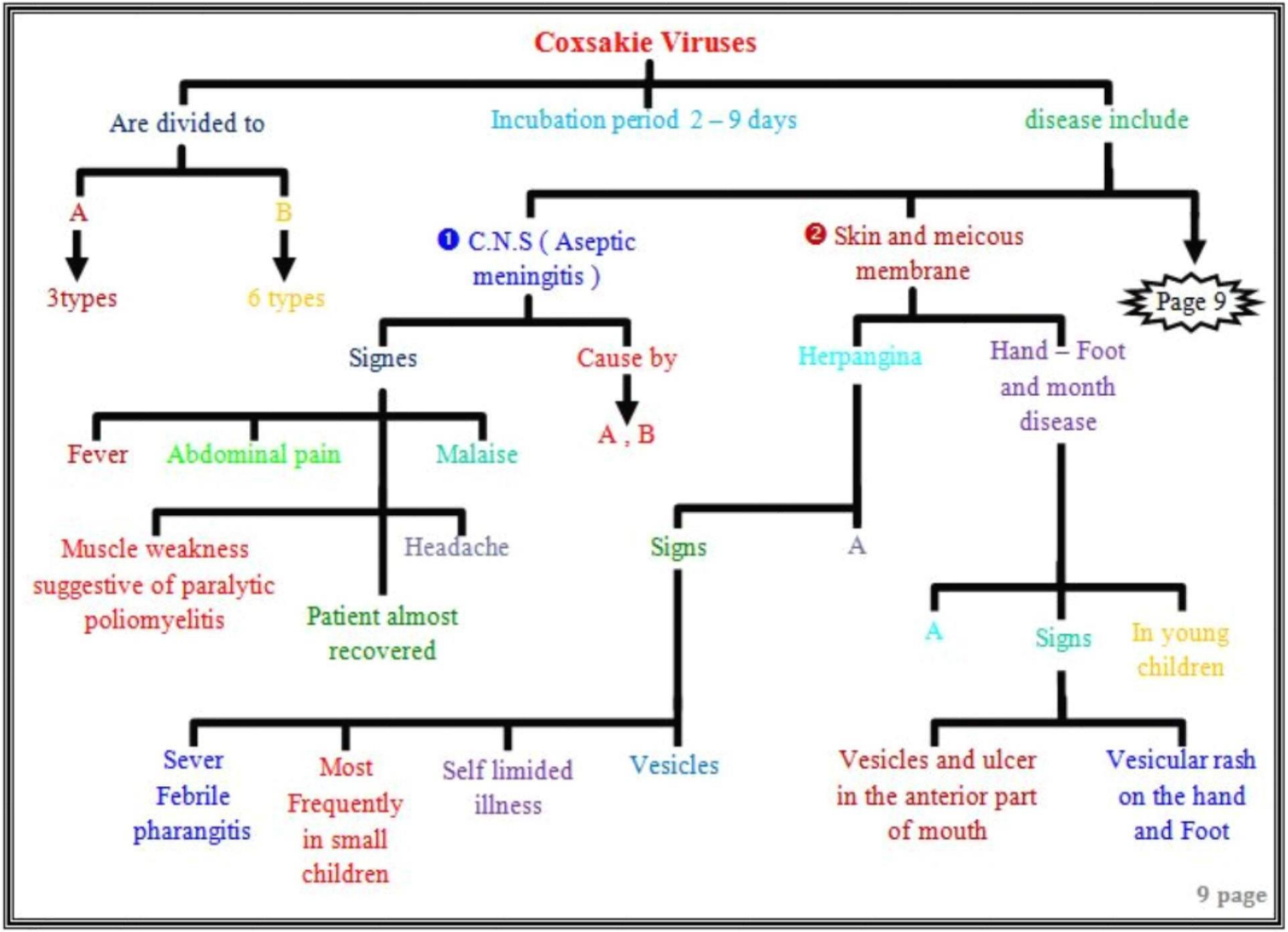
4 Hyper immunoglobulin (Gamma Globulin)

it provides protection For Few Weeks against poliomyelitis disease .Effective only if given shortly before infection

Important Features of polio Virus Vaccine

Attribute	Killed (Salk)	Live (Sabin)
- Rout of administration	Injection	oral
-prevents disease	Yes	yes
- interrupts transmission	No	yes
- induce humoral I g G	Yes	yes
- induce intestinal I g A	- No	yes
- interferes with replication of a virulent viruses in gut	- No	yes
- Can cause disease ICP in pregnancy	- No	yes
- Reverts to virulence	- No	yes
- Requires Refrigerator	- No	yes
- Duration of immunity	- Shorter	Longer
- Cost	- high	Low

The table mention above refere to advantages and disadvantages of polio virus vaccines


Coxsakie Viruses
Are divided to
Incubation period 2 – 9 days
disease include
A
B
3types
6 types
1 C.N.S (Aseptic meningitis)
2 Skin and meicous membrane
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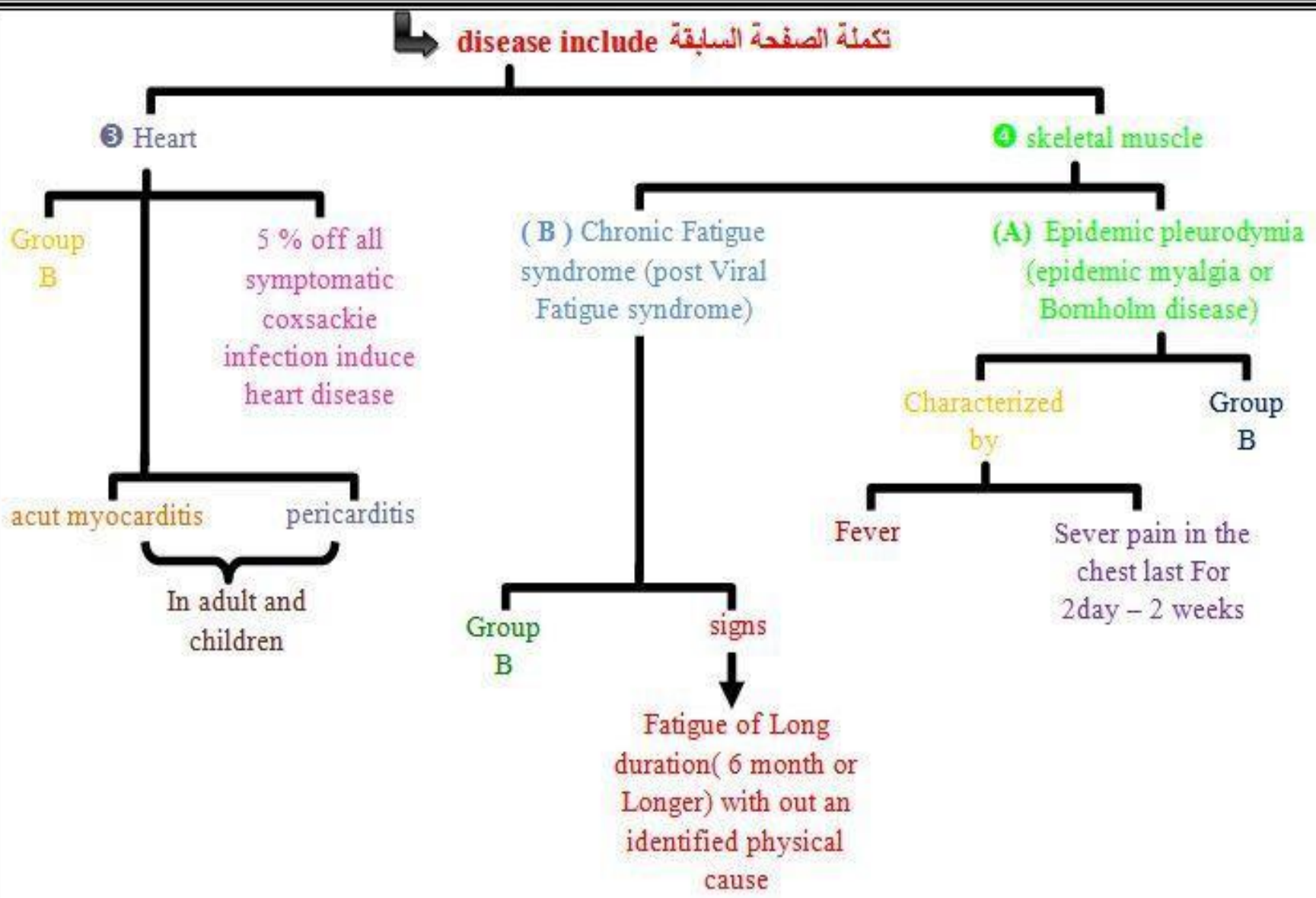
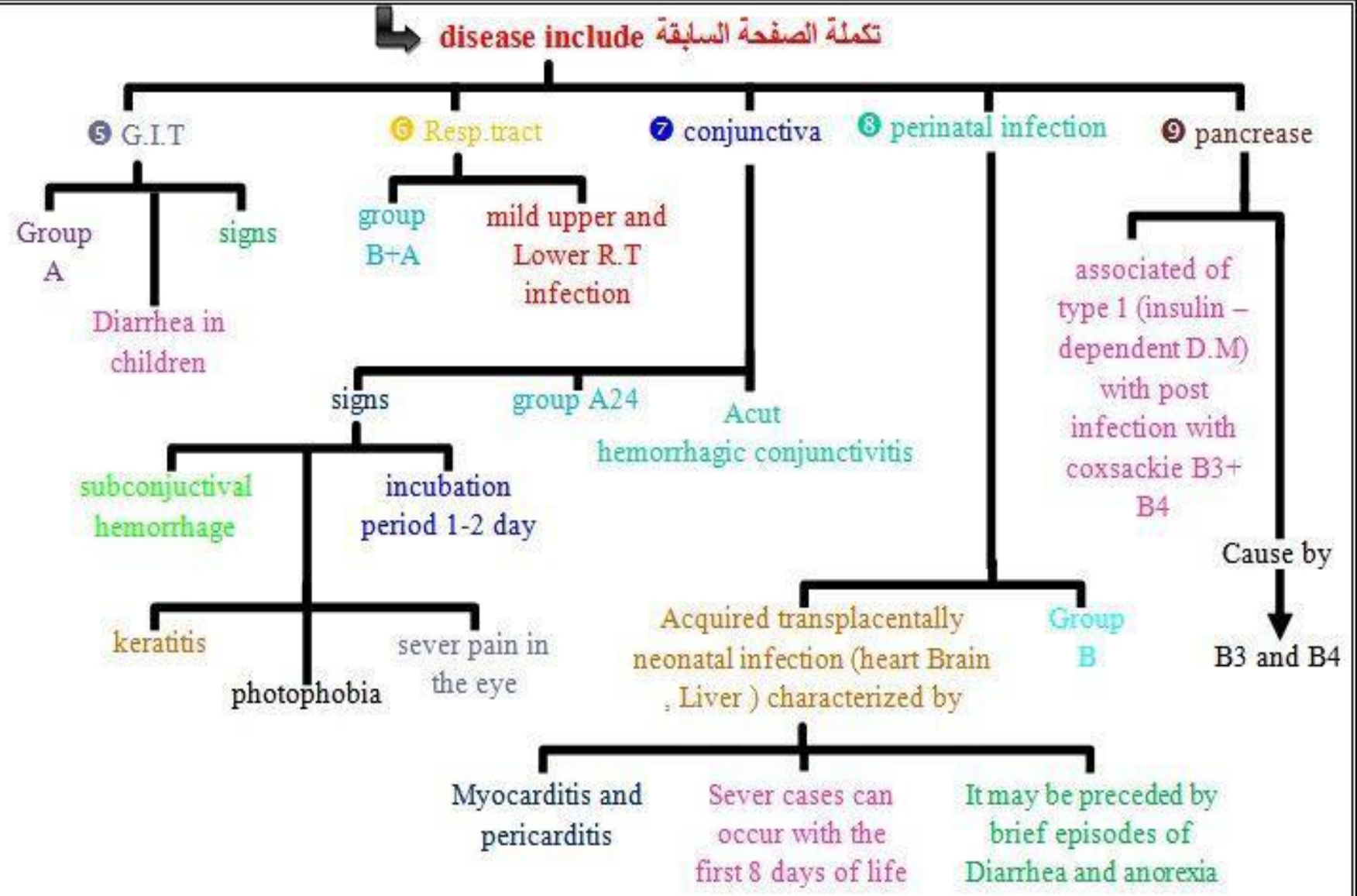
Signes
Cause by
A , B
Fever
Abdominal pain
Malaise
Muscle weakness suggestive of paralytic poliomyelitis
Headache
Patient almost recovered
Herpangina
Hand – Foot and month disease
Signs
A
Sever Febrile pharangitis
Most Frequently in small children
Self limided illness
Vesicles
A
Signs
In young children
Vesicles and ulcer in the anterior part of mouth
Vesicular rash on the hand and Foot


disease include تكملة الصفحة السابقة
3 Heart
4 skeletal muscle
Group B
5 % off all symptomatic coxsackie infection induce heart disease
acut myocarditis
pericarditis
In adult and children
(B) Chronic Fatigue syndrome (post Viral Fatigue syndrome)
(A) Epidemic pleurodymia (epidemic myalgia or Bornholm disease)
Characterized by
Group B
Fever
Sever pain in the chest last For 2day – 2 weeks
Group B
signs
Fatigue of Long duration(6 month or Longer) with out an identified physical cause


disease include تكملة الصفحة السابقة
5 G.I.T
6 Resp.tract
7 conjunctiva
8 perinatal infection
9 pancrease
Group A
signs
Diarrhea in children
group B+A
mild upper and Lower R.T infection
signs
group A24
Acut hemorrhagic conjunctivitis
subconjuctival hemorrhage
incubation period 1-2 day
keratitis
photophobia
sever pain in the eye
Acquired transplacentally neonatal infection (heart Brain , Liver) characterized by
Group B
Myocarditis and pericarditis
Sever cases can occur with the first 8 days of life
It may be preceded by brief episodes of Diarrhea and anorexia
associated of type 1 (insulin – dependent D.M) with post infection with coxsackie B3+ B4
Cause by
B3 and B4