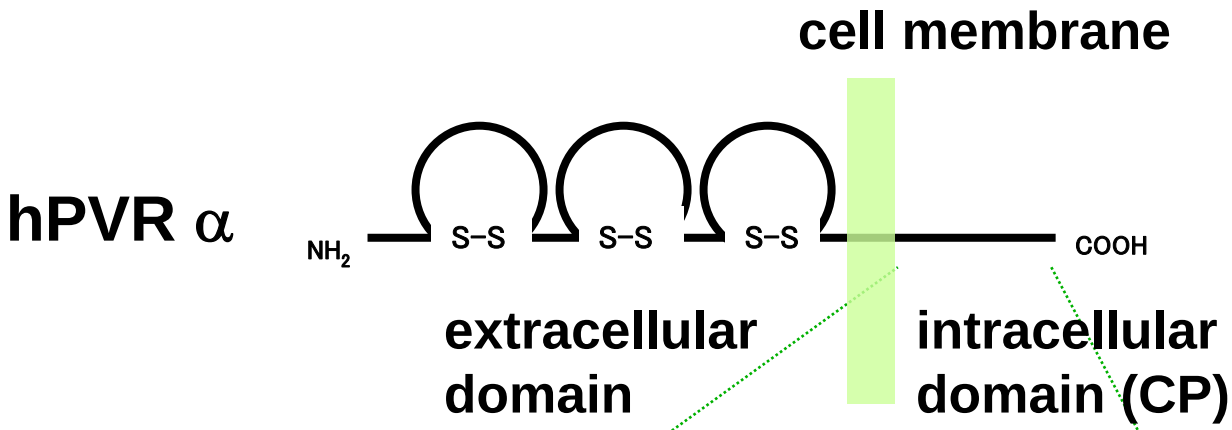
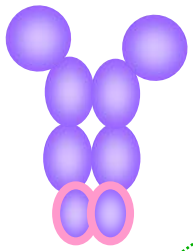
Interactions between hPVR cytoplasmic domain and Tctex-1 (Yeast two-hybrid system)





Bait: antidroic motor protein
cytoplasmic dynein
light chain 1 (Tctex-1)

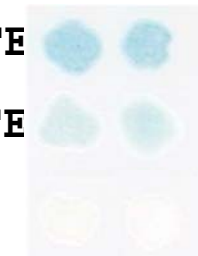
Prey

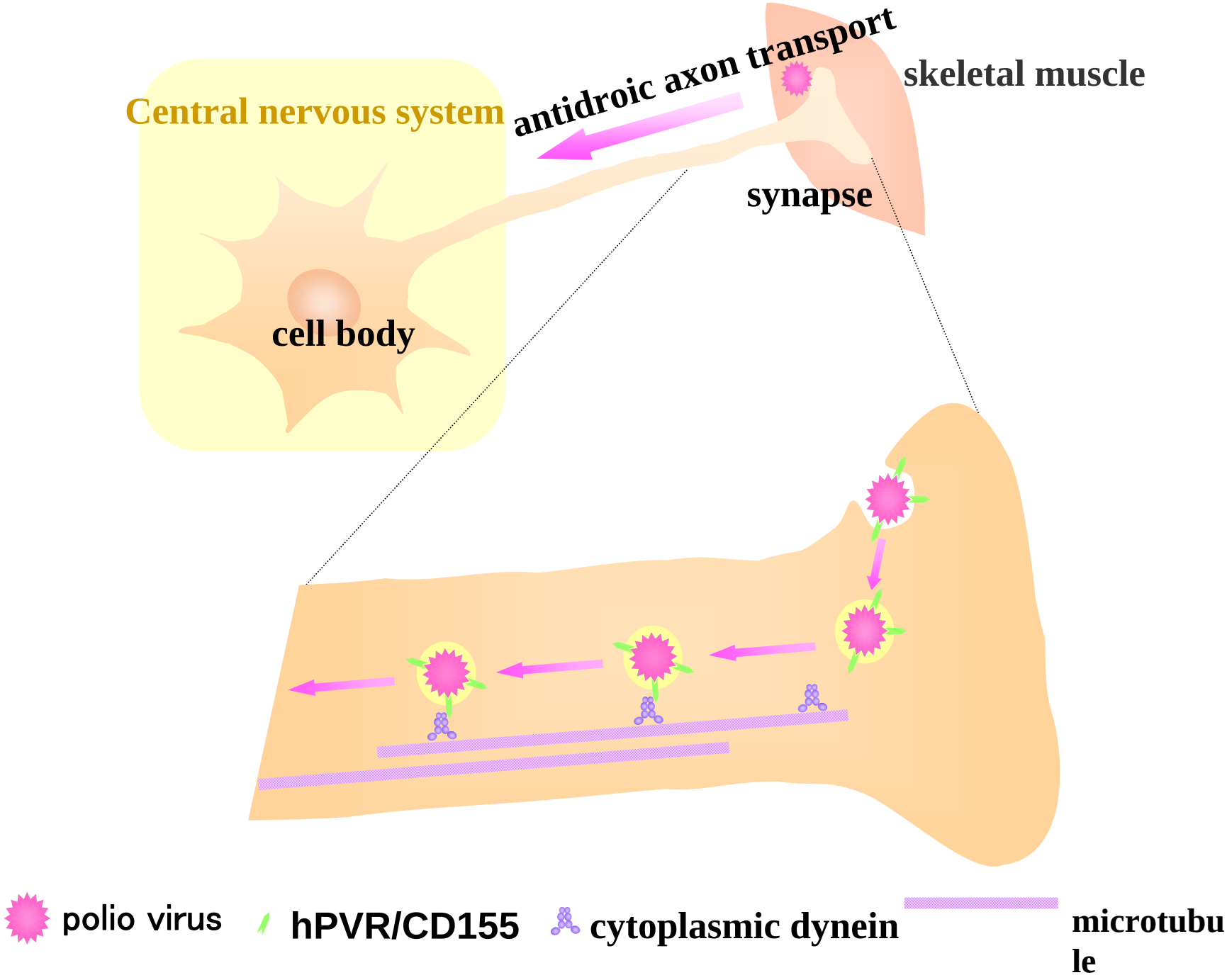
β-gal

hPVR CPα SKCSREVLWHCHLCPSSTEHASASANGHVSYSAVSRENSSSQDPQTE

hPVR CPMα SACSAEVLWHCHLCPSSTEHASASANGHVSYSAVSRENSSSQDPQTE

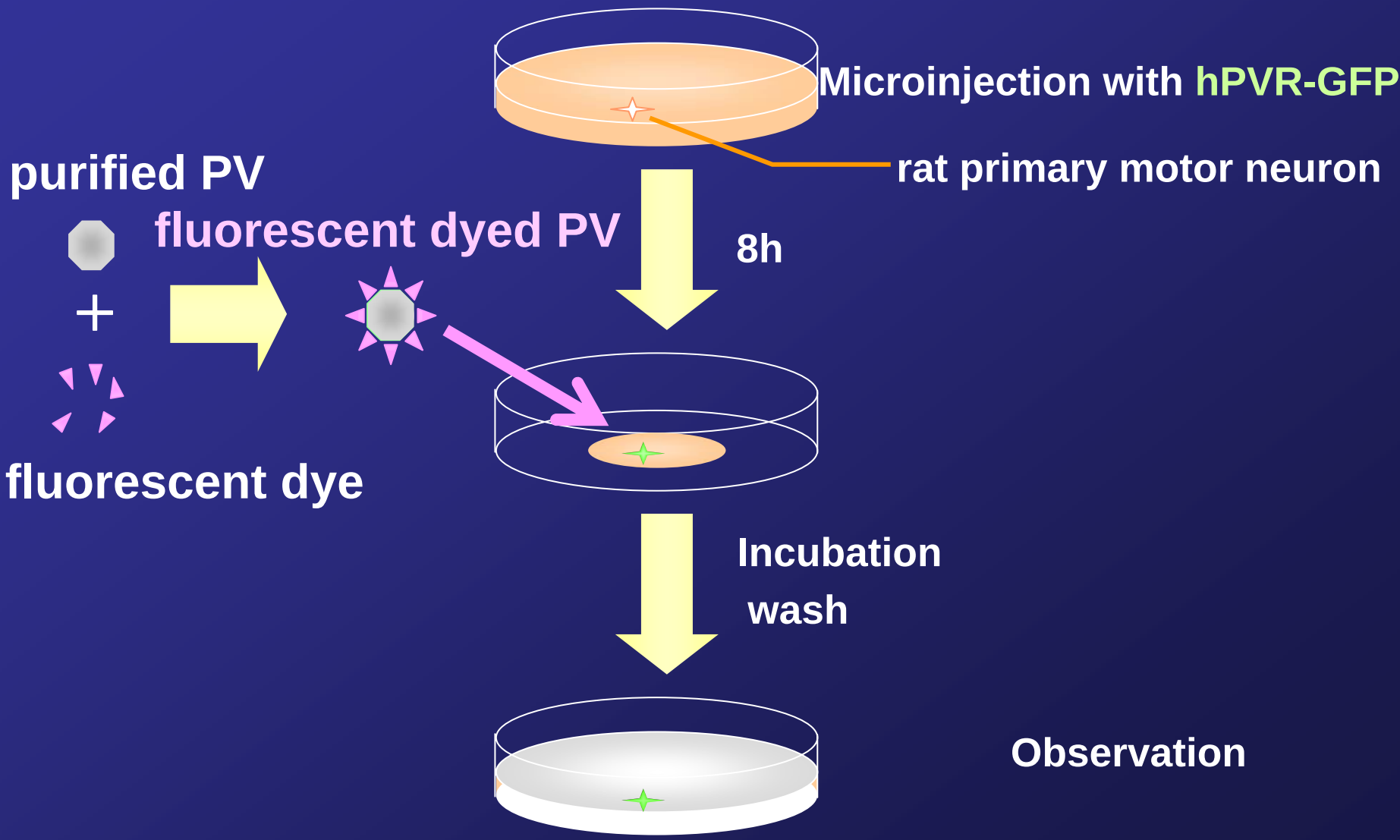
Negative control



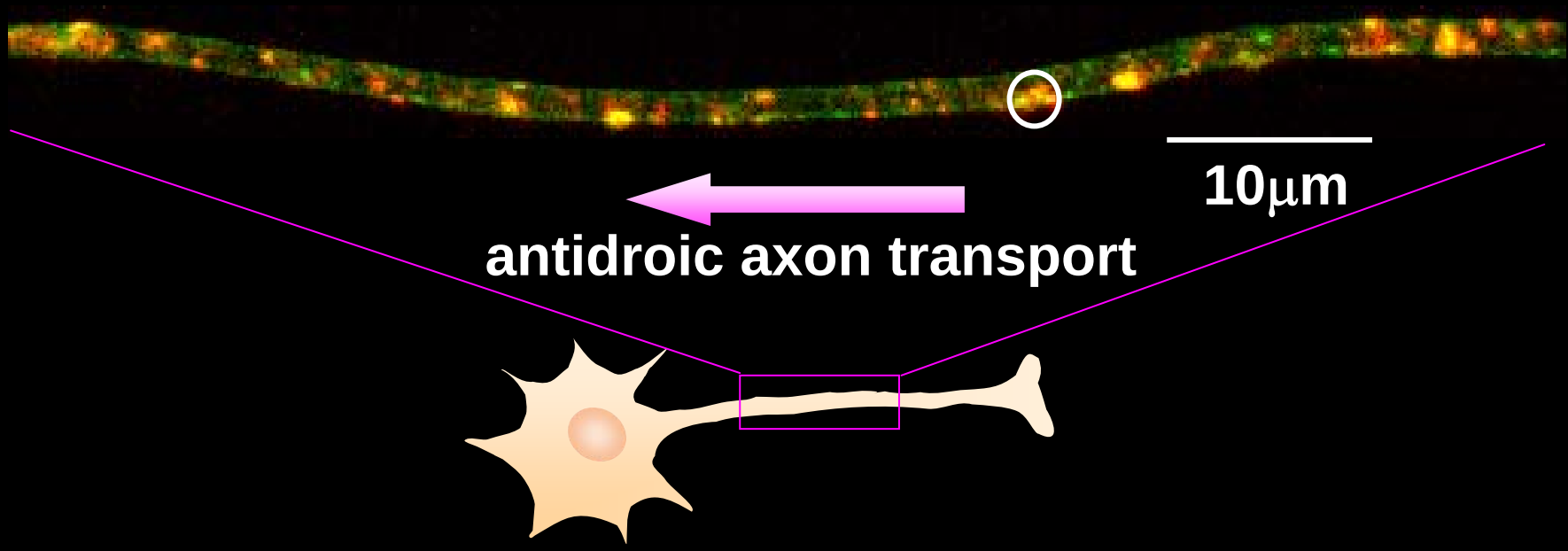

Central nervous system
antidroic axon transport
skeletal muscle
synapse
cell body
polio virus
hPVR/CD155
cytoplasmic dynein
microtubu
le

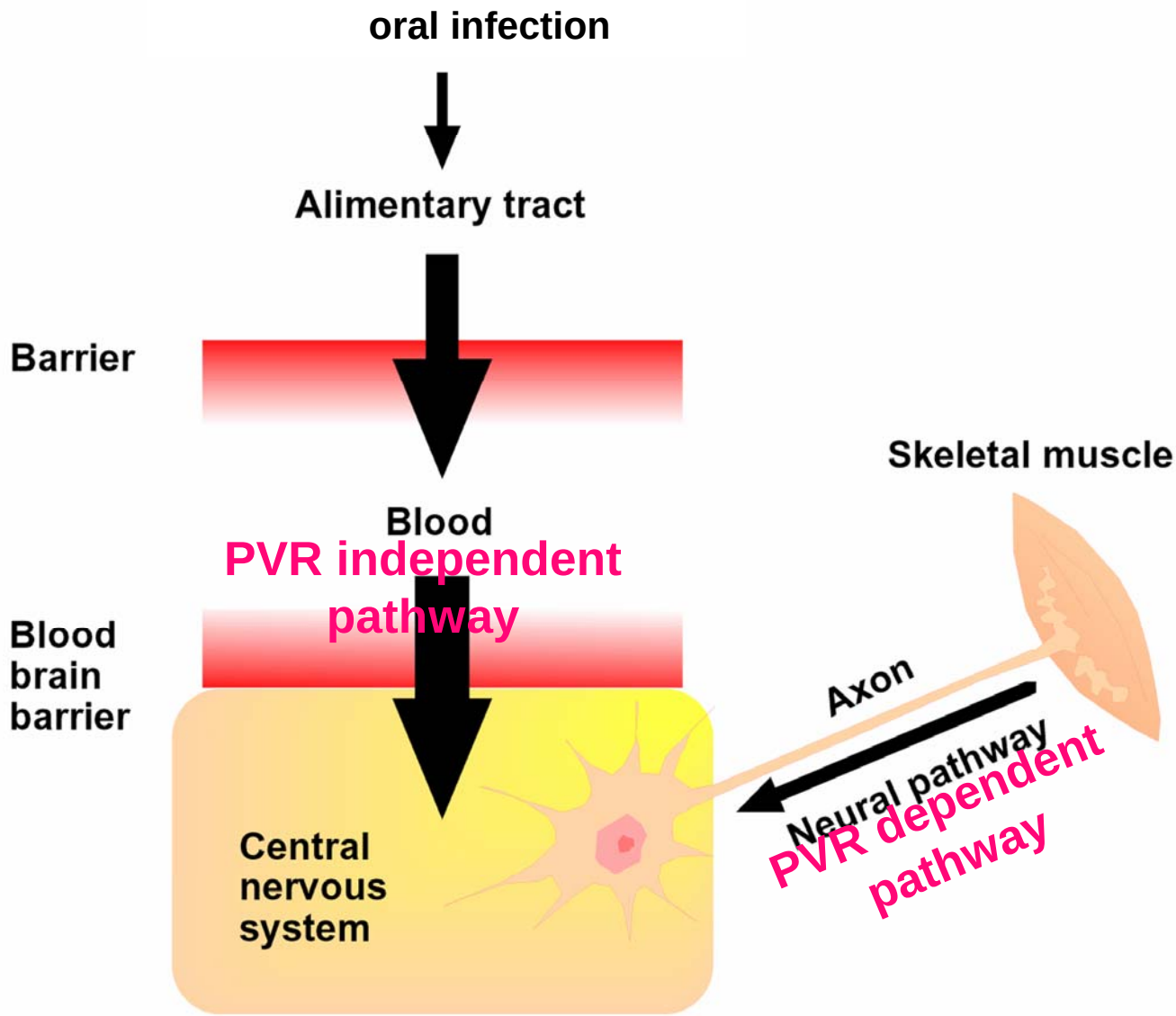
Establishment of PV highly sensitive detection system:

Direct staining of PV by fluorescent dye
Direct observation of PV in a raw cell



antidroic axon transport of vesicles containing both hPVR and PV



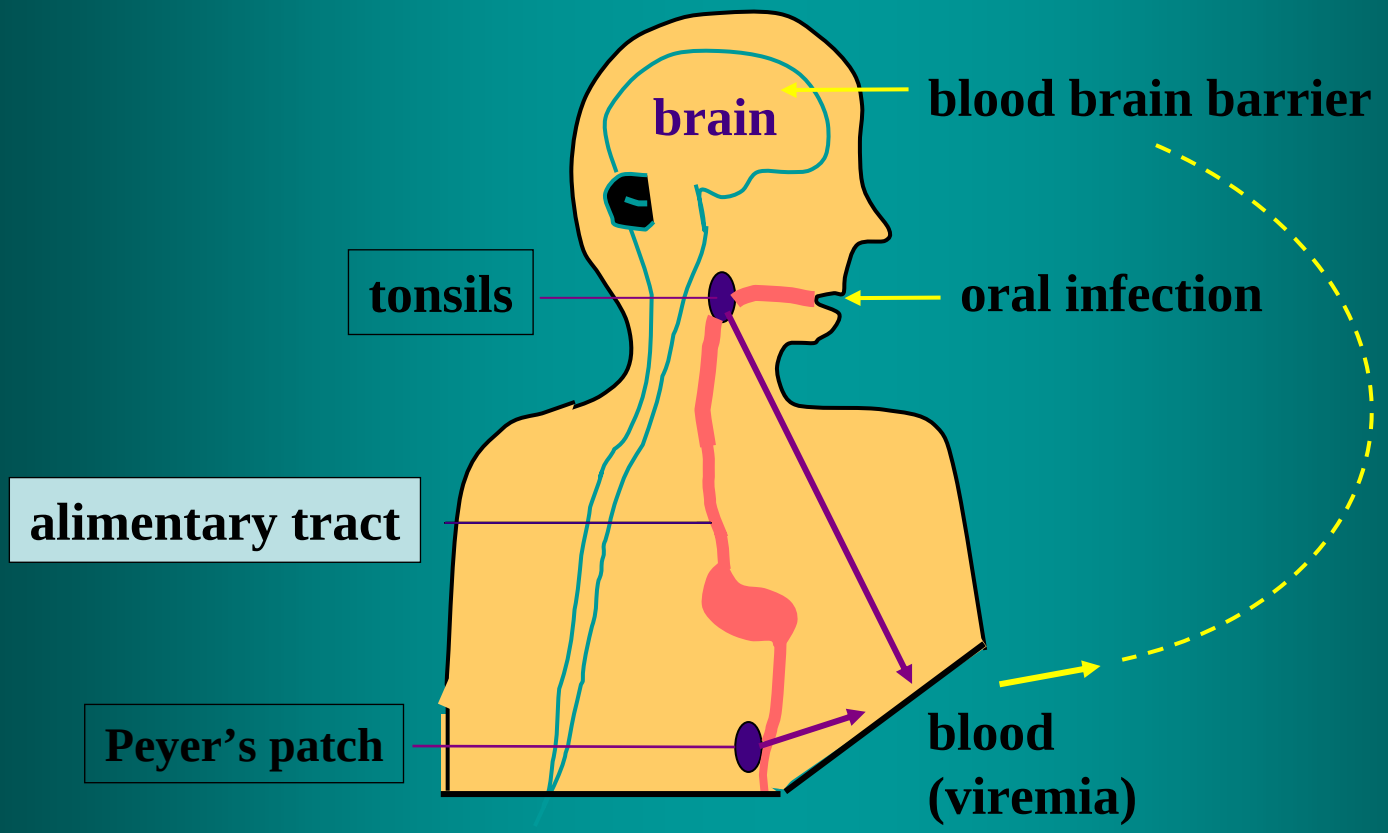


Pathway of polio virus transmission in the body

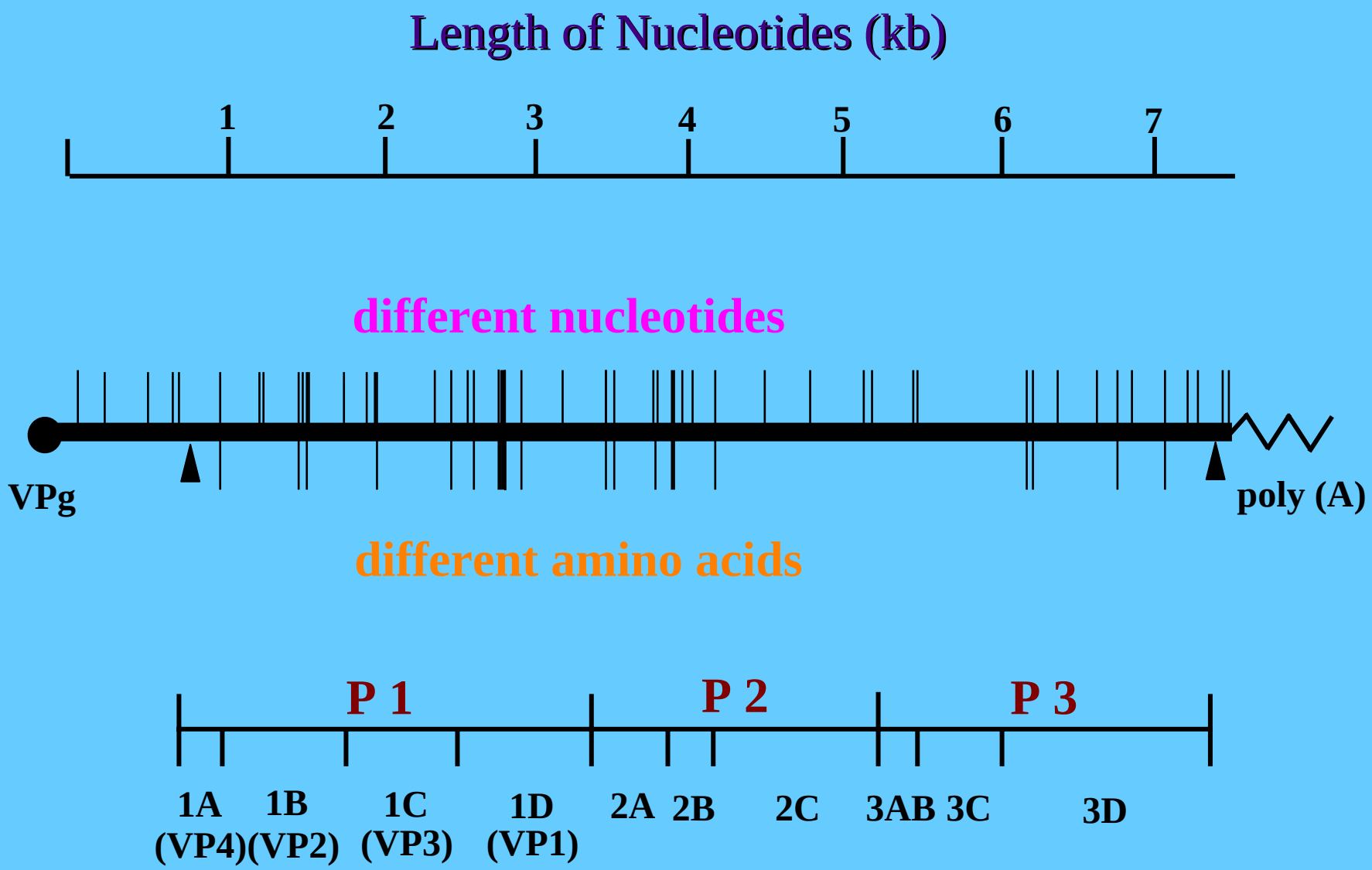
Research on pathogenicity

1. Mechanisms for determining species-specificity
2. Mechanisms of dissemination
3. Mechanisms for determining tissue-specificity
4. Ability to cause damage to the target cell

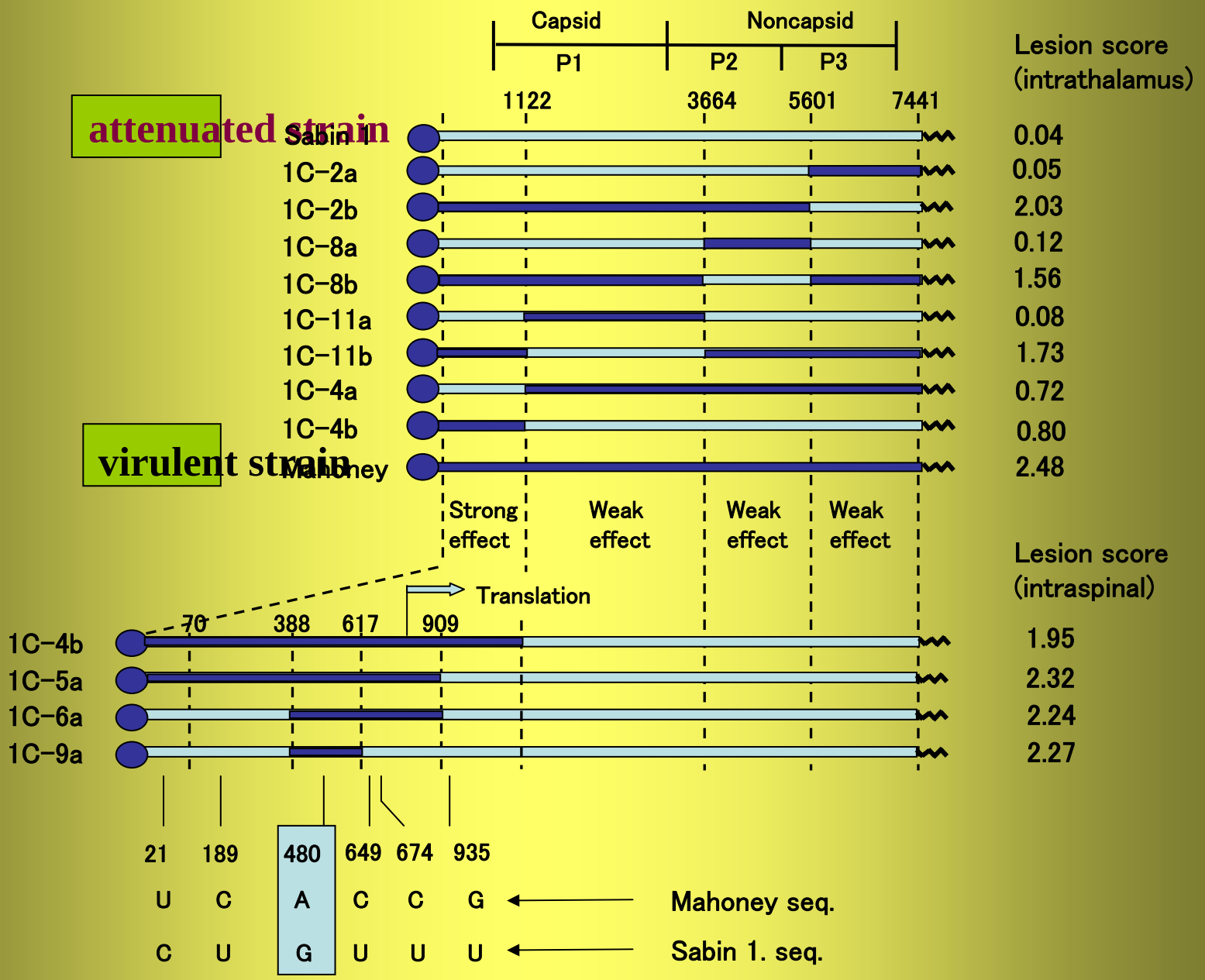
Dissemination of the Polio Virus in Humans



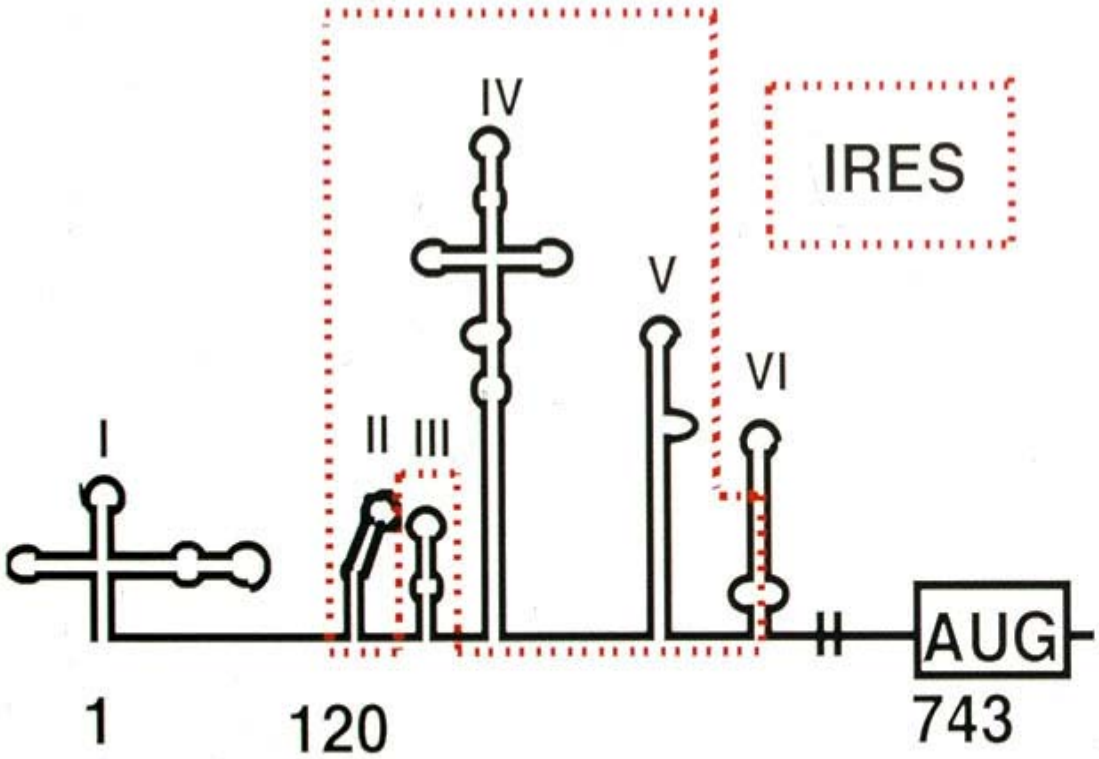
	alimentary tract	viremia	CNS
Virulent strain	○	○	○
Attenuated strain	○	×	×


Length of Nucleotides (kb)
1
2
3
4
5
6
7
different nucleotides
VPg
poly (A)
different amino acids
P 1
P 2
P 3
1A
(VP4)
1B
(VP2)
1C
(VP3)
1D
(VP1)
2A
2B
2C
3AB
3C
3D

Genome structures of recombinant viruses



Poliovirus IRES and Host Factors

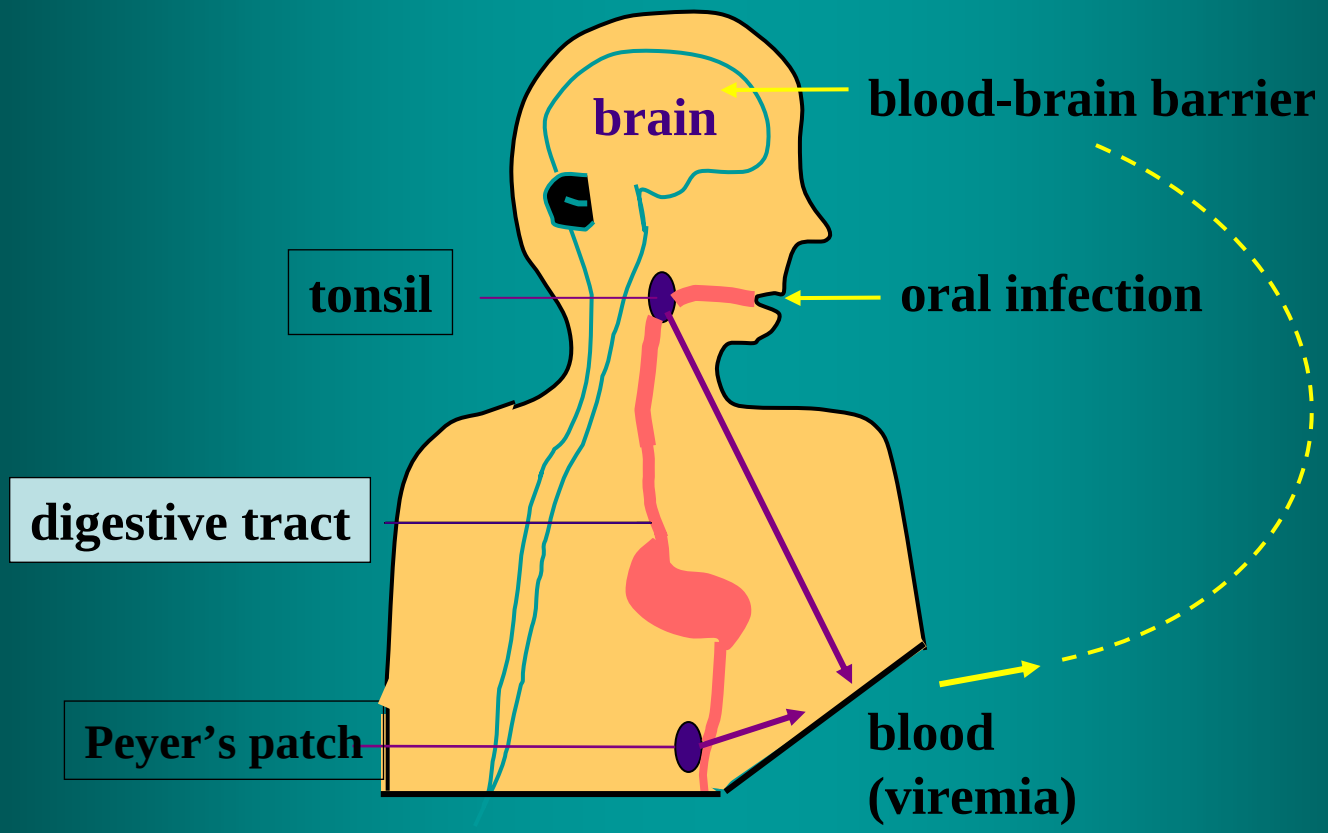


Cellular factors for IRES

La protein (SLVI)
PCBP-1,2 (SLI, IV)
PTB (SLV)

IRES: Internal Ribosome Entry Site

Polio virus transmission in the human body

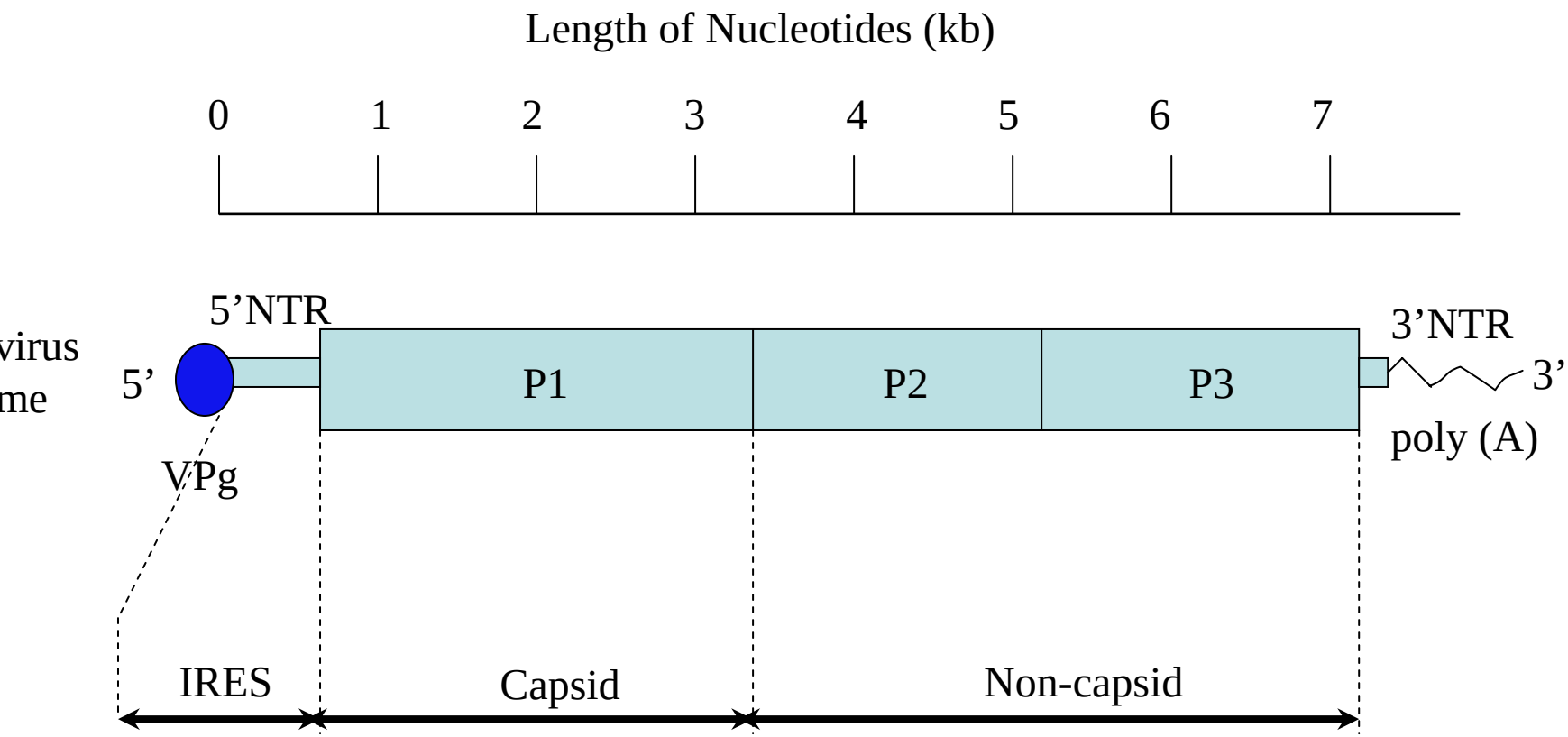


	digestive tract	viremia	central nerve system
high virulent strain	○	○	○
less virulent strain	○	×	×

Principles of viral tropism

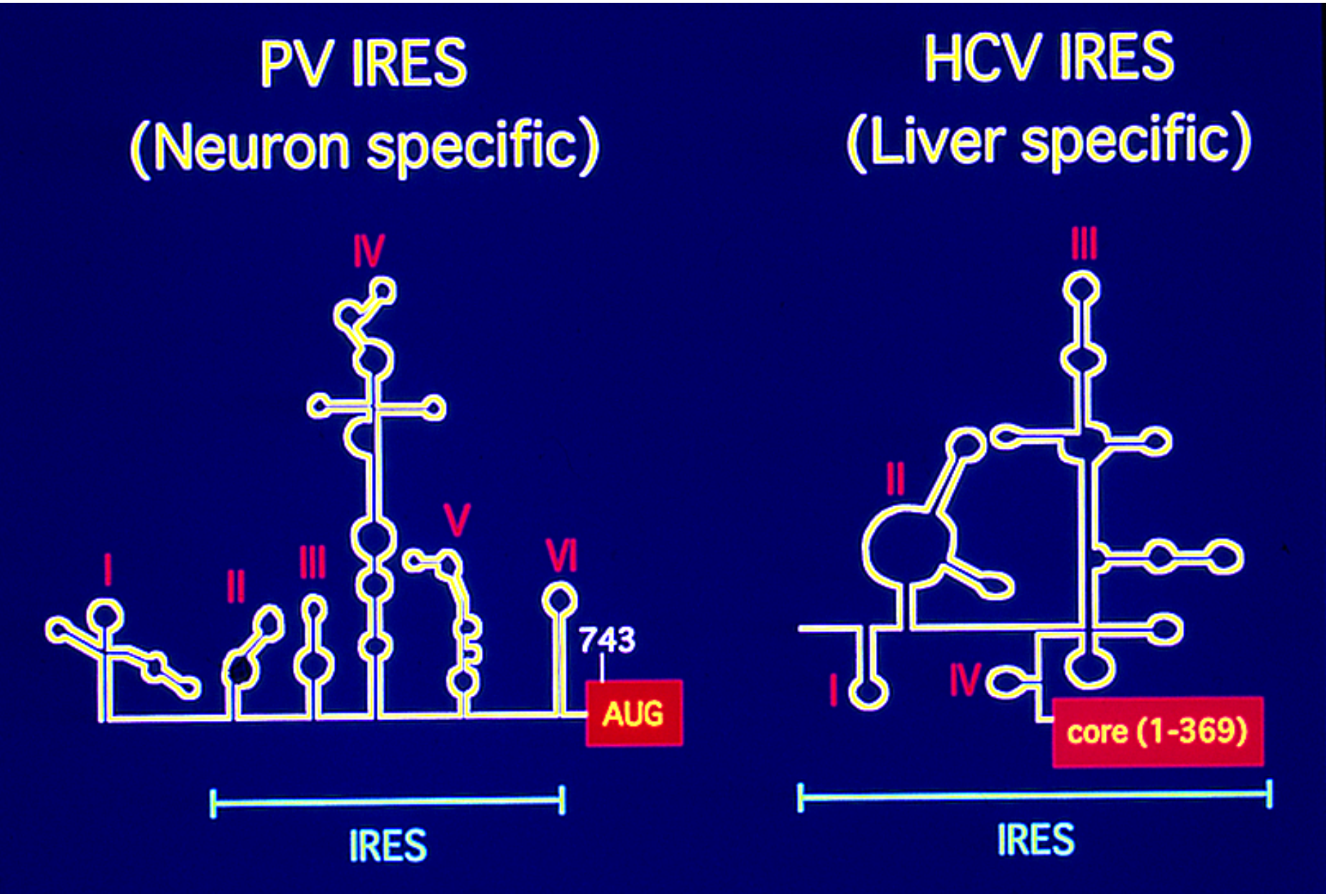
1. Receptor-dependent tropism
2. Protease-dependent tropism
3. IRES-dependent tropism
4. Natural immunity-dependent tropism
5. Others

Functions of polio virus genomes during pathogenicity expression



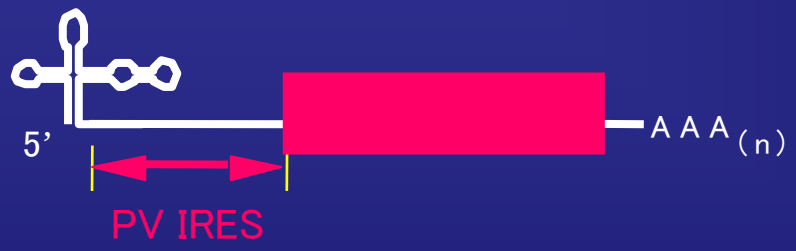
translation starts （tissue specificity in central nervous system）

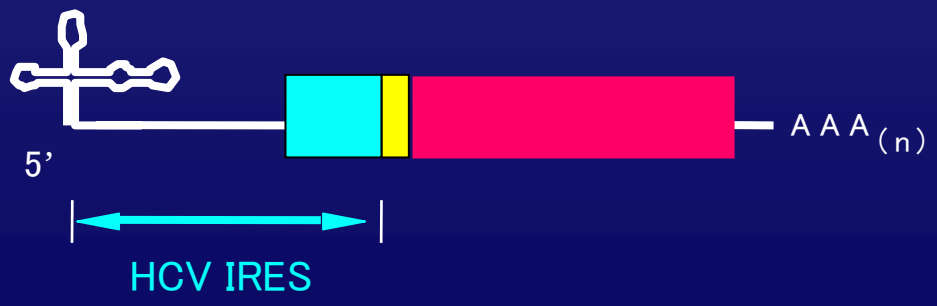
PVR recognition （species specificity） mechanism of transmission


PV IRES
(Neuron specific)
IV
I
II
III
V
VI
743
AUG
IRES
HCV IRES
(Liver specific)
III
II
I
IV
core (1-369)
IRES

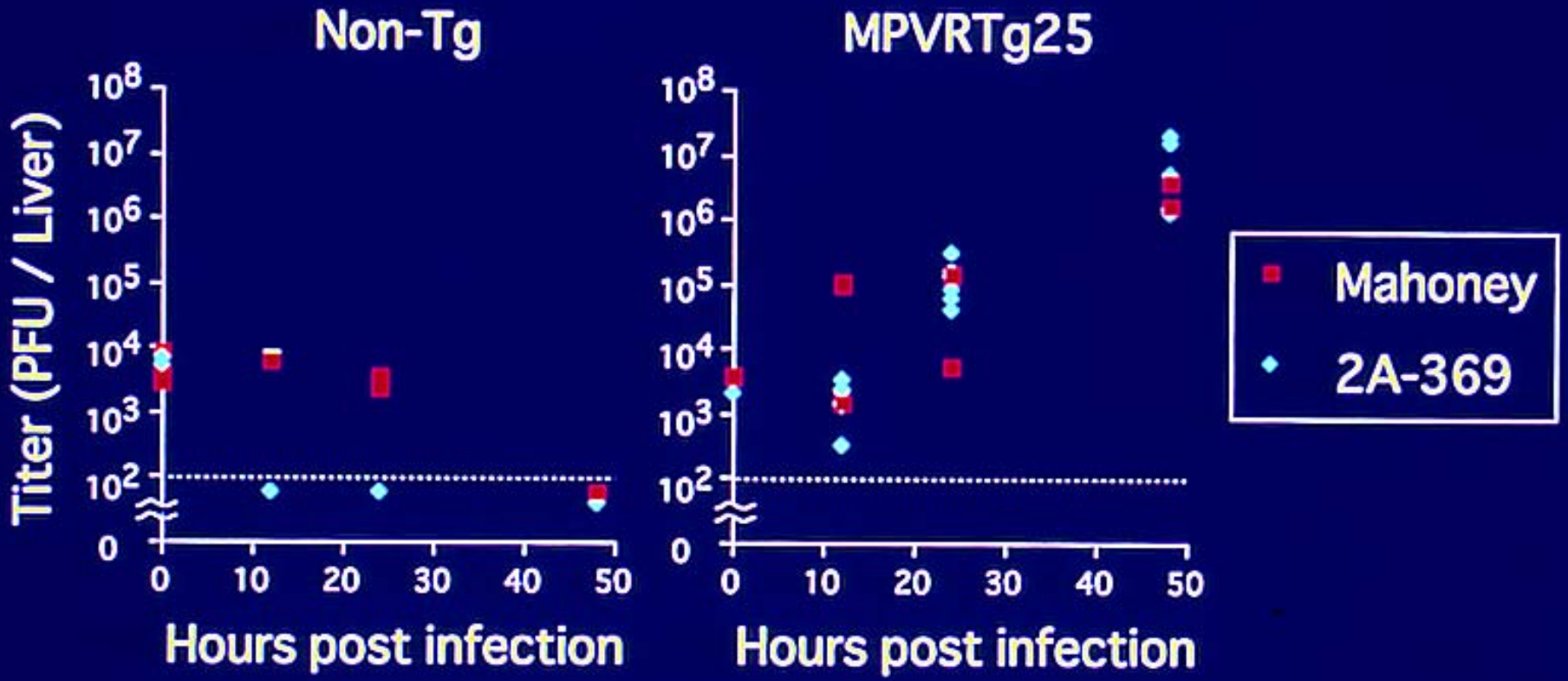
Virus Tissue Specificity Directed by IRES

	Brain	Liver
Mahoney virus	+	+
2A−369 virus	−	+





Time Course of Virus Titers in The Liver after Inoculation into The Liver.



Principles of viral tropism

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Research on pathogenicity

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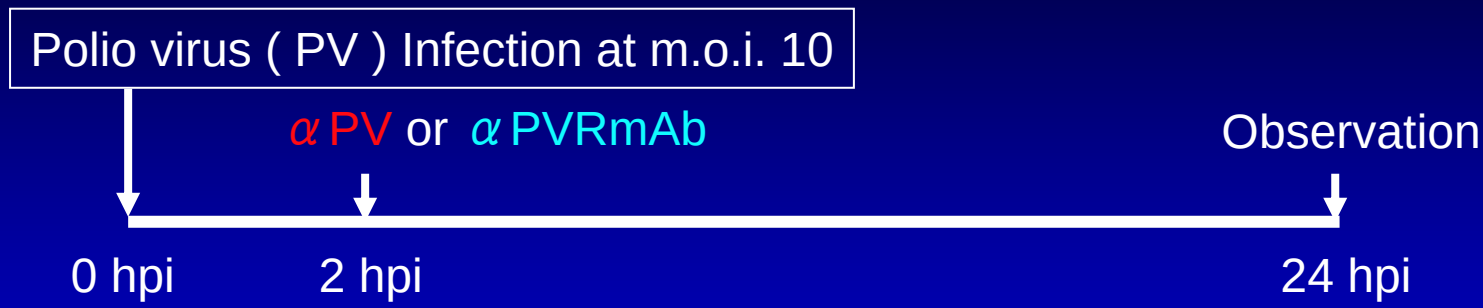
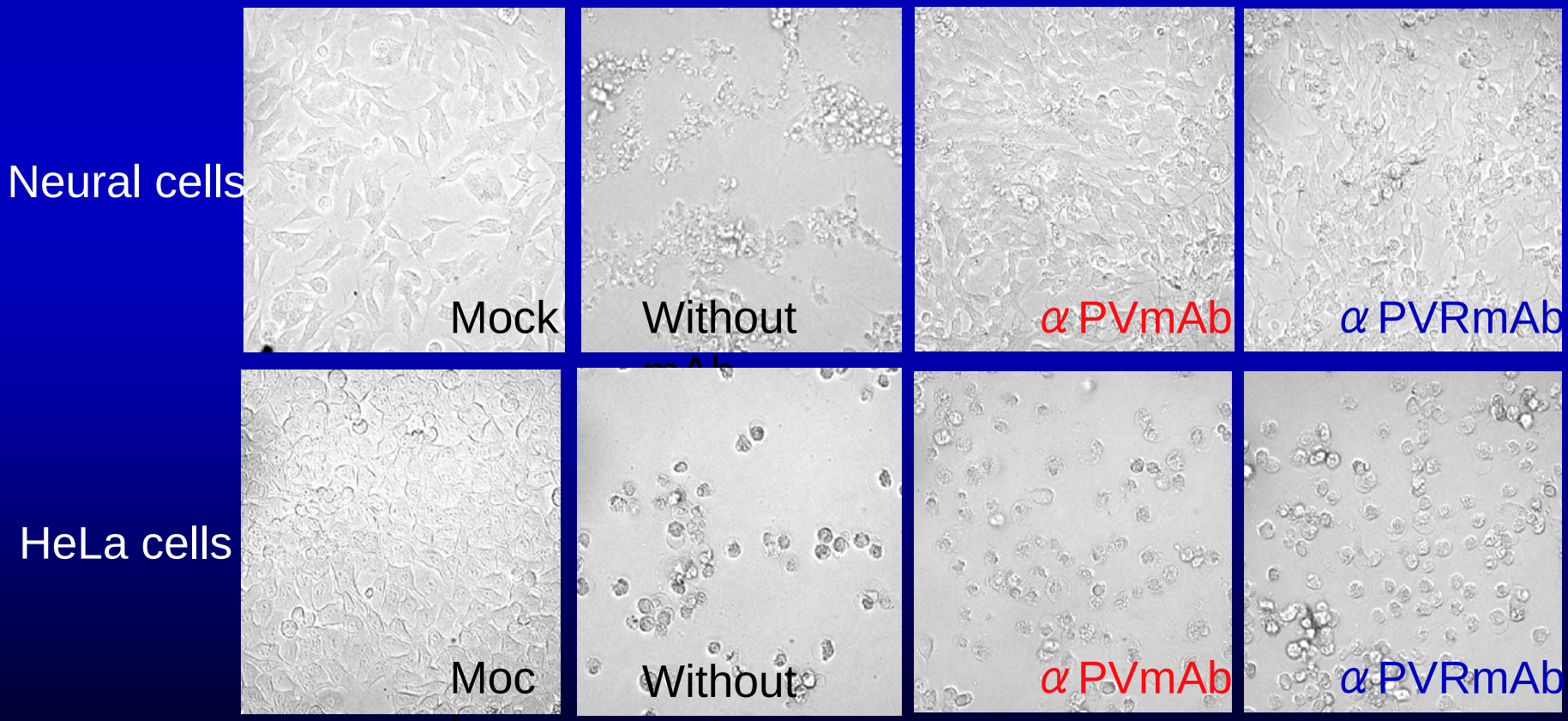
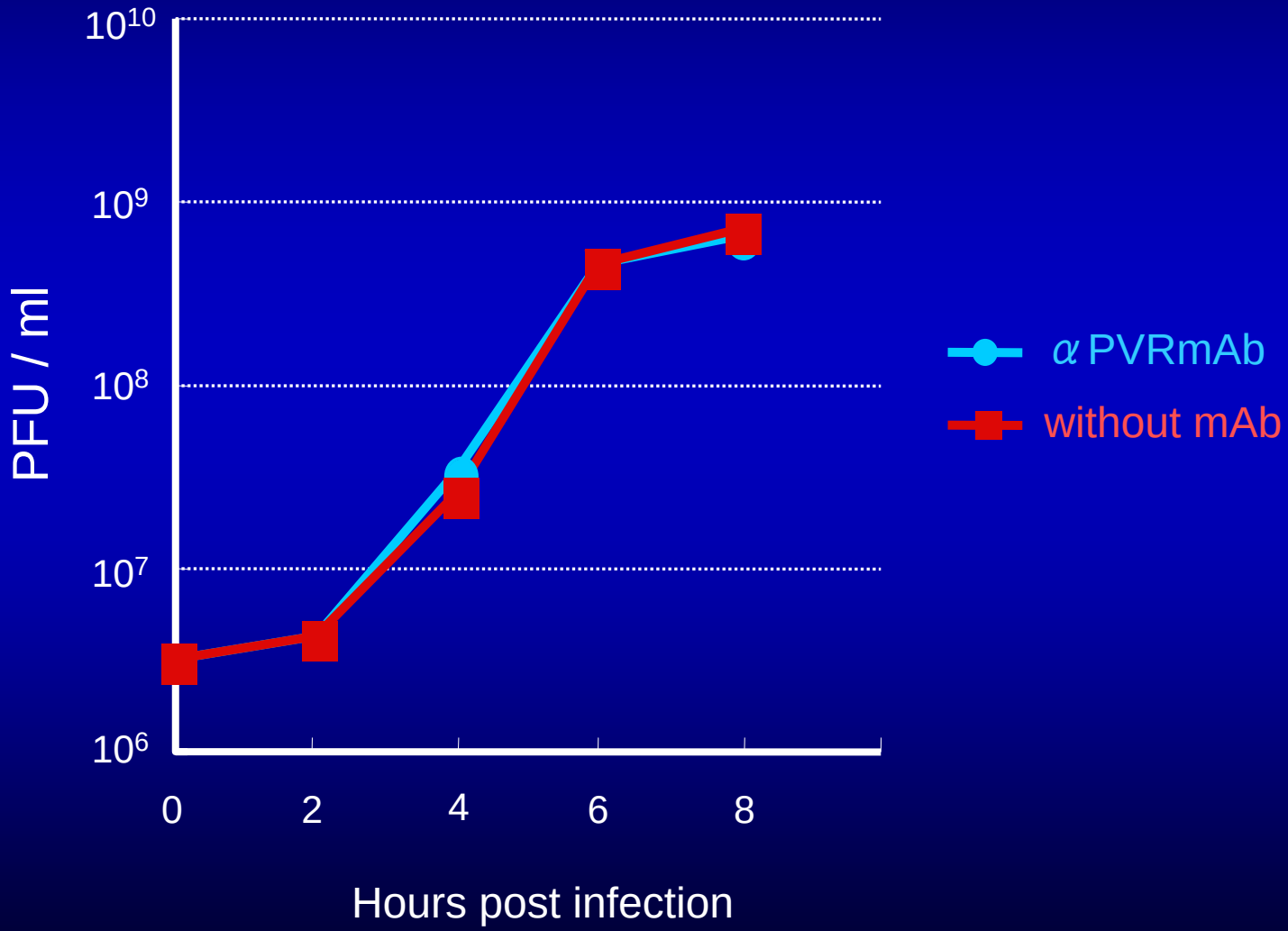
Polio virus resistance in nerve cells

Inhibition of PV-induced Cytopathic Effect in Neural Cells by mAbs

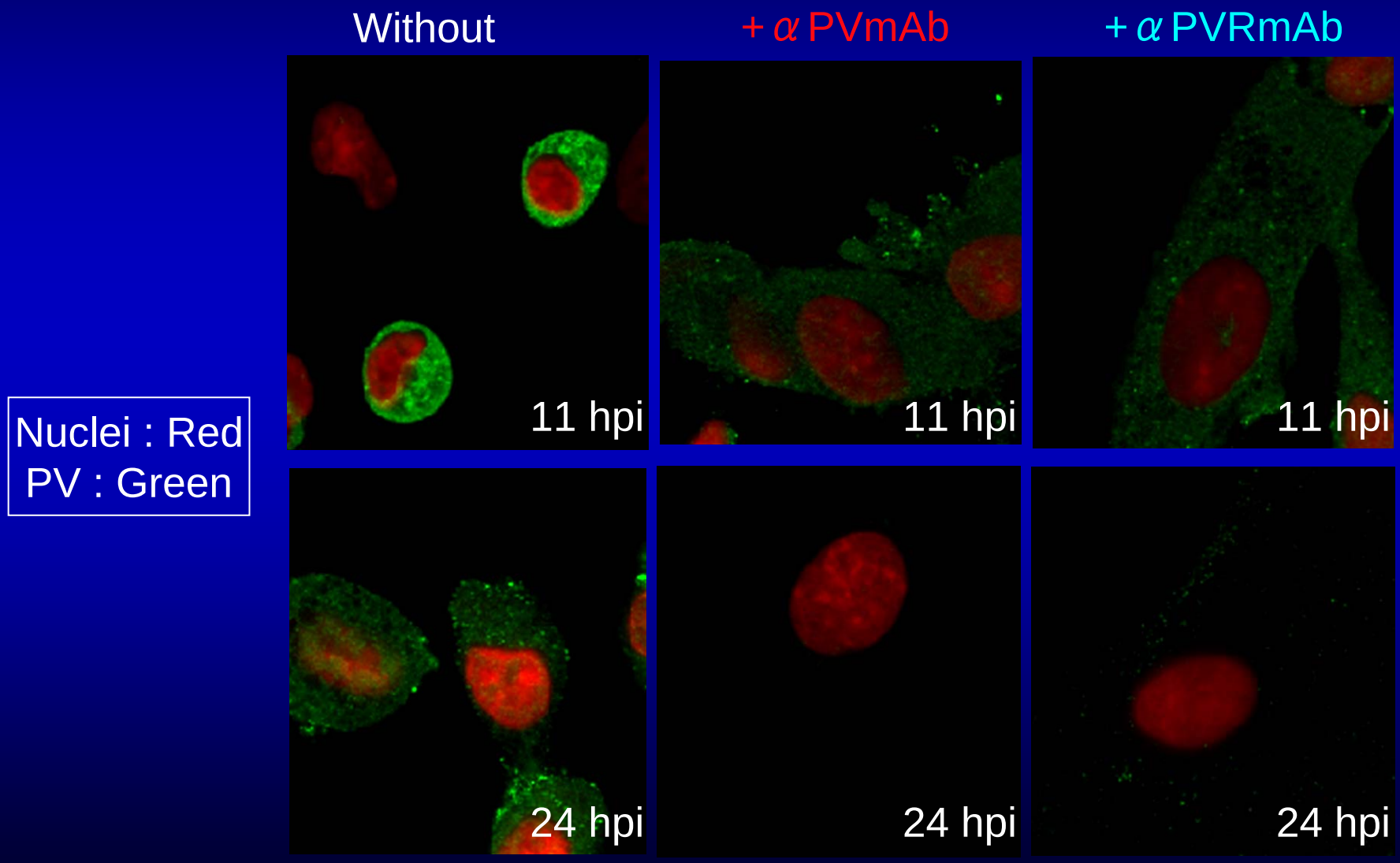




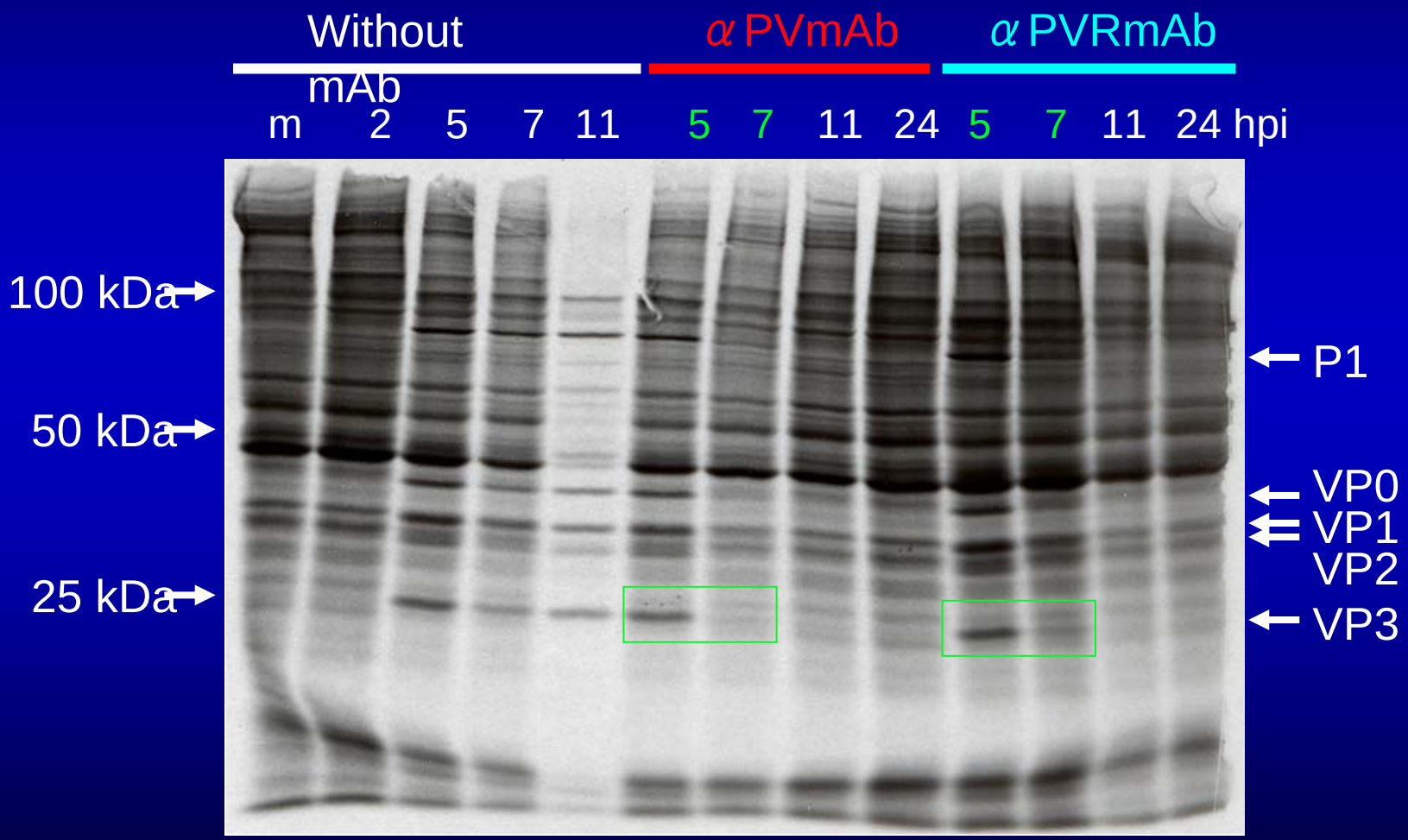
One Step Growth Kinetics of PV Replication in Neural Cells



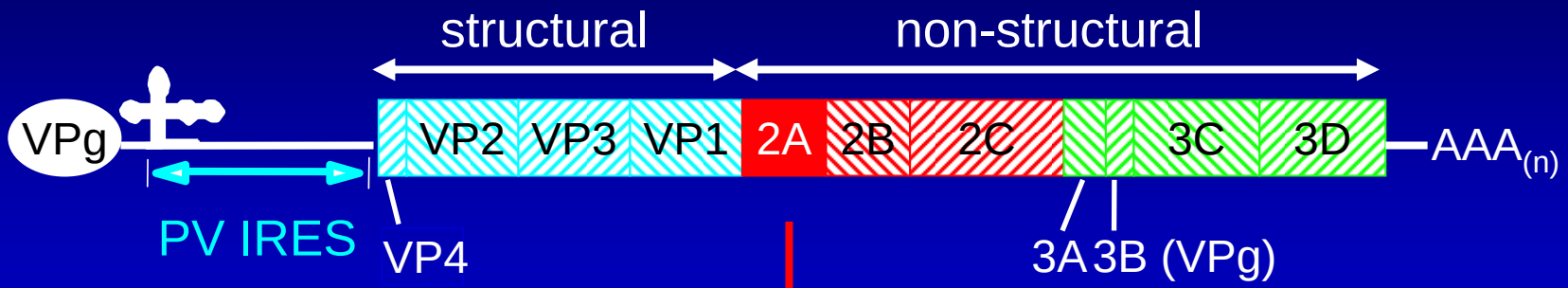
PV Replication in Neural Cells Treated by mAbs 2 hpi



Protein Synthesis in PV-infected Neural Cells

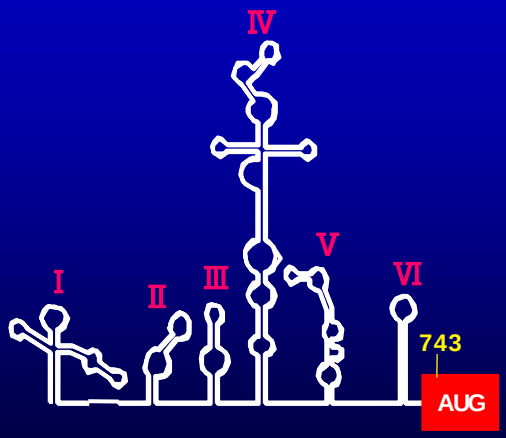


Structure of Polio Virus (PV) RNA



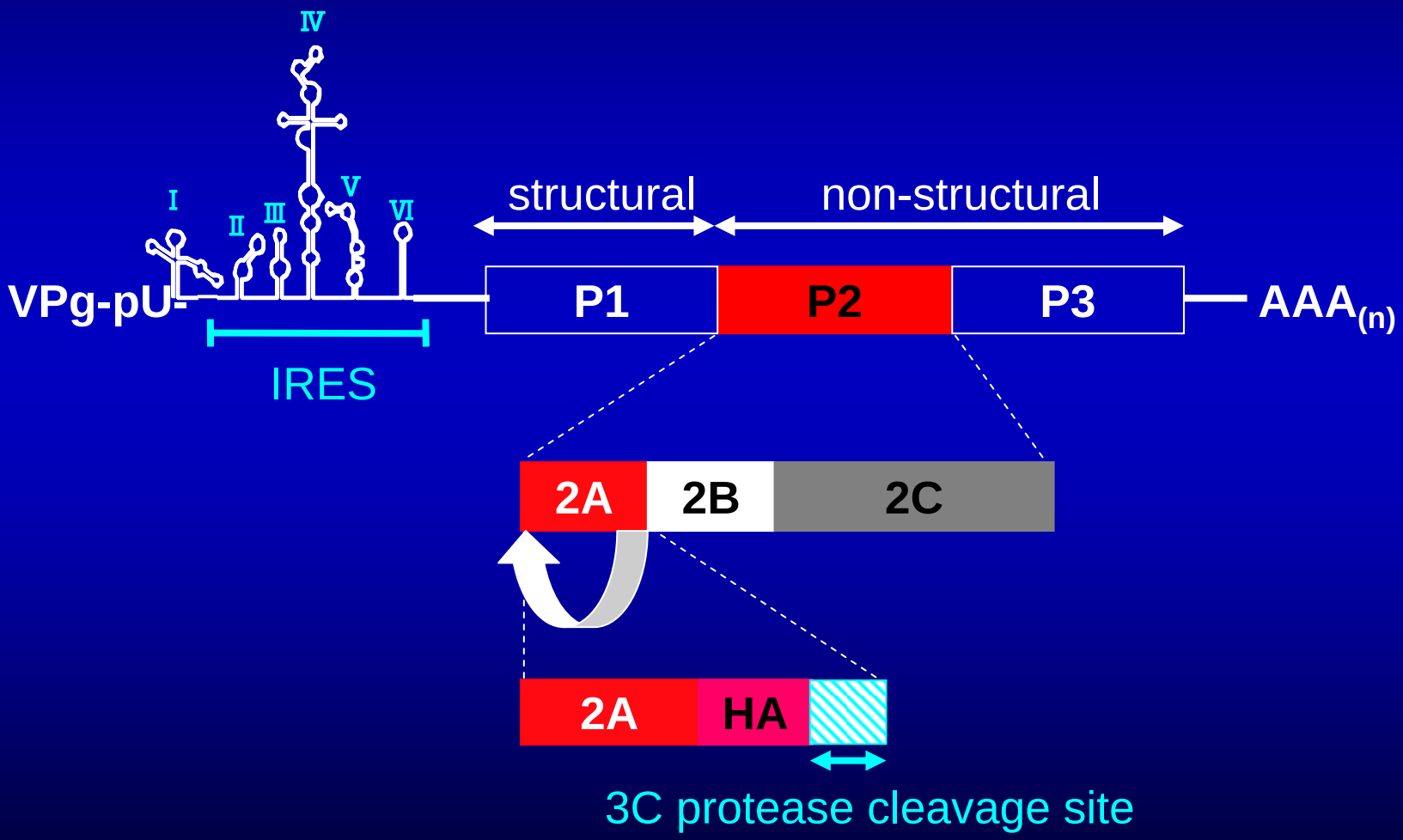
Translation initiation
IRES-dependent virus tropism

CPE expression
eIF4G cleavage

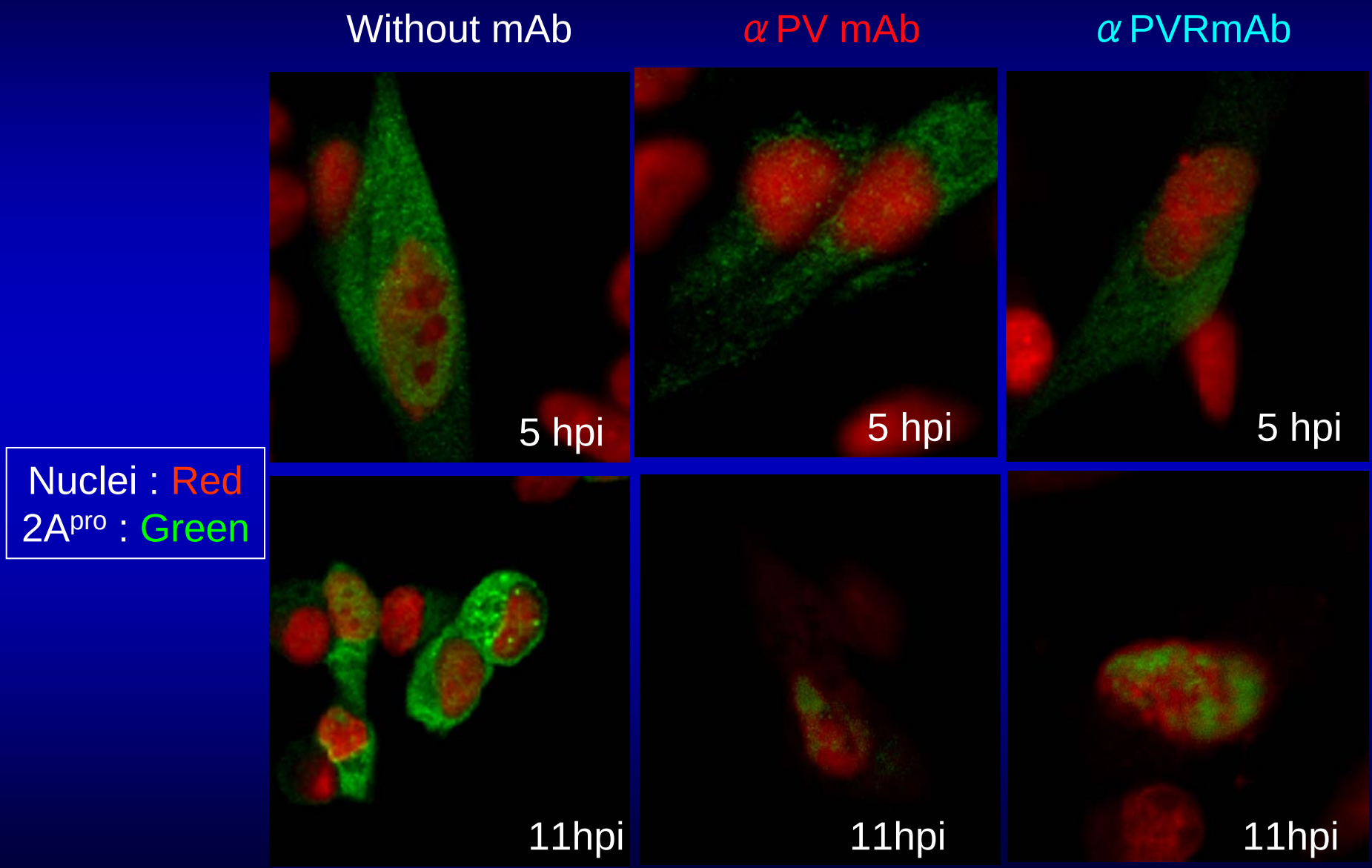


IRES

Structure of HA-tagged 2A Virus



Localization of HA-tagged PV 2A^{pro} in Neural cells

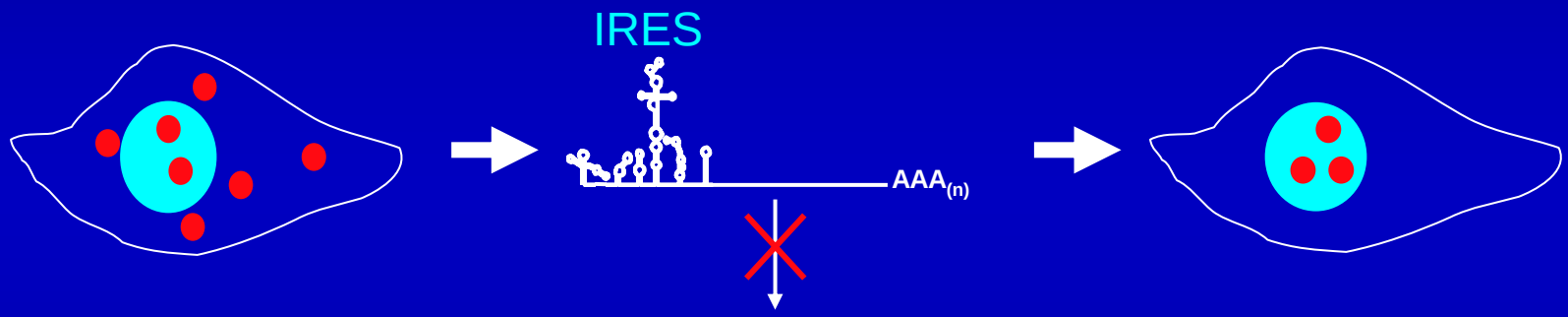


Neural Cells in the Presence of mAb

5 hpi

7 hpi

11 hpi



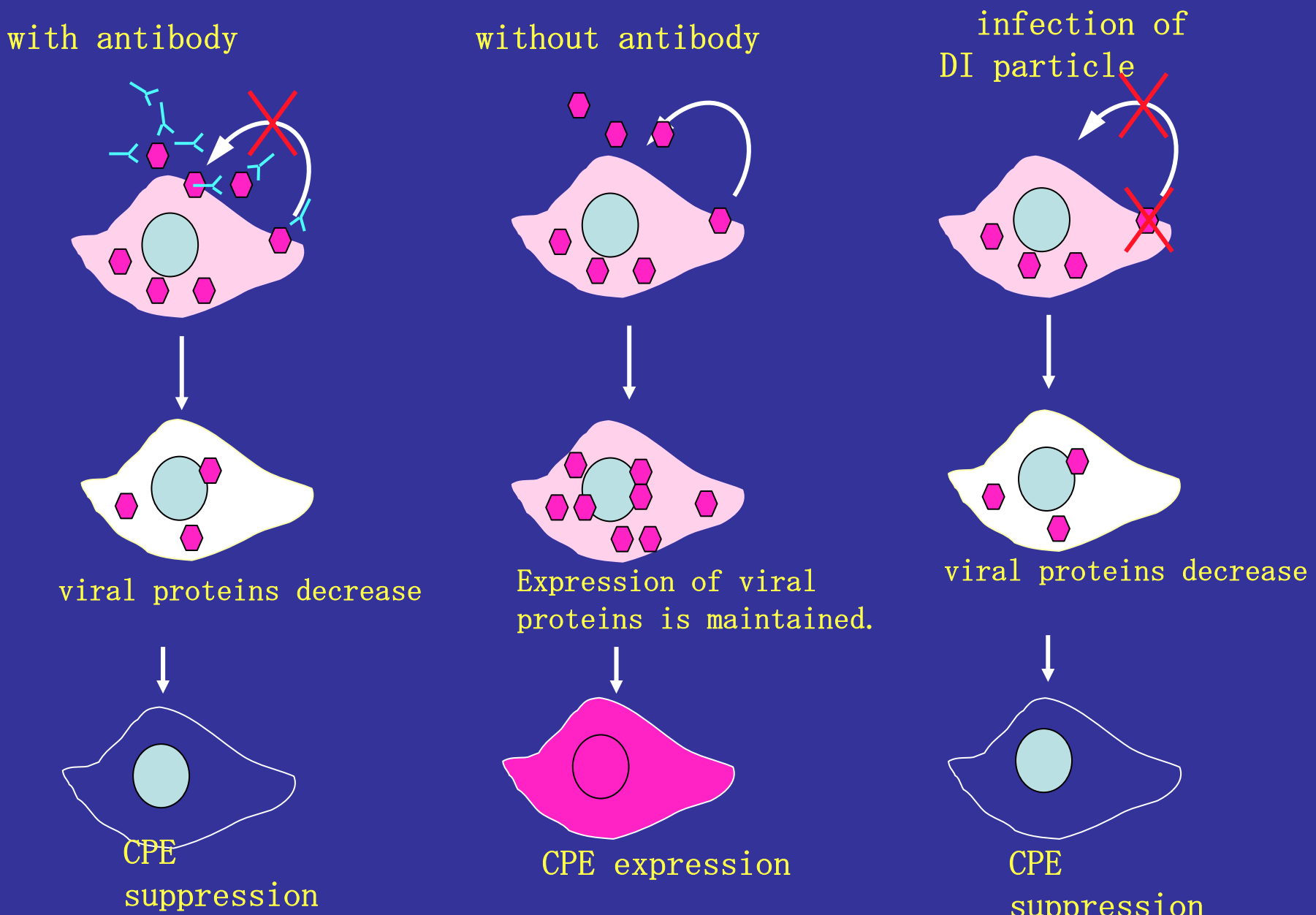
2A^{pro} located both in cytoplasm and nucleus.
eIF4G was cleaved.

PV IRES was inhibited.
No newly synthesized 2A^{pro}.

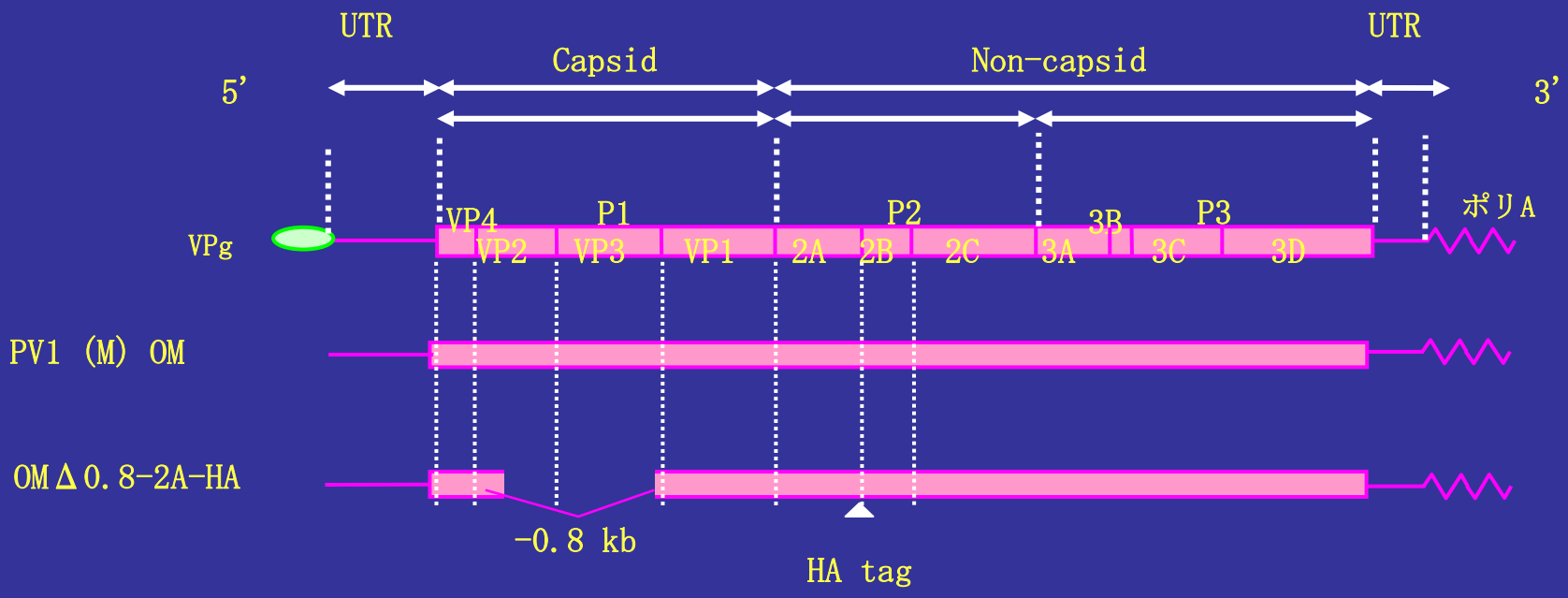
2A^{pro} located in nucleus.
Appearance of intact eIF4G.

No CPE

Hypothesis on CPE expression mechanism in SK-N-SH cells



Genome structure of a DI particle



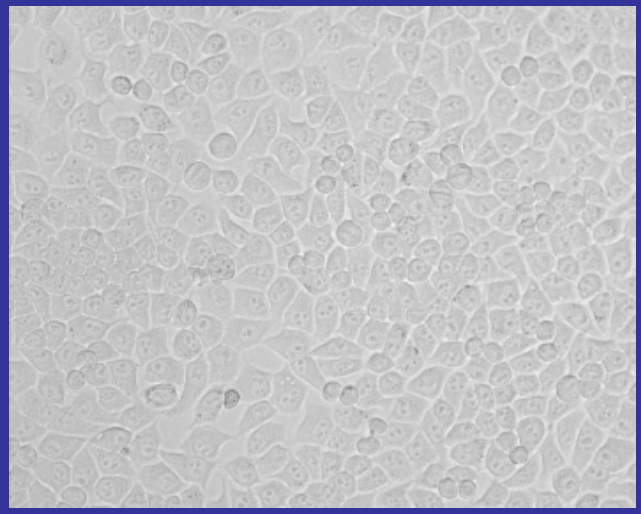
Progeny virion is not generated.

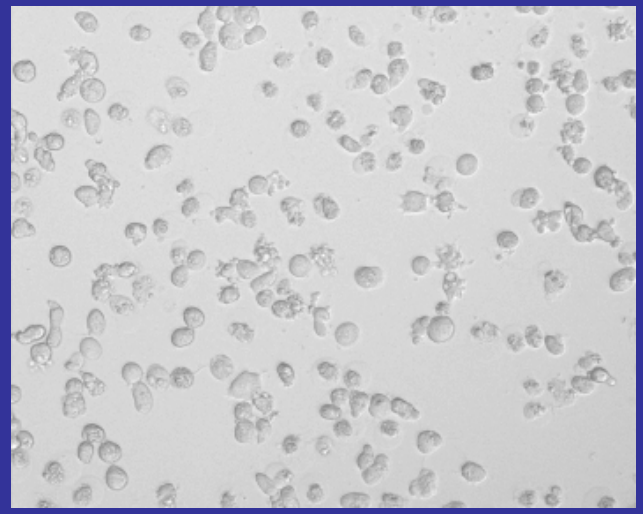
CPE expression by single infection of a DI particle

Mock

+DI

HeLa cell





SK-N-SH cell