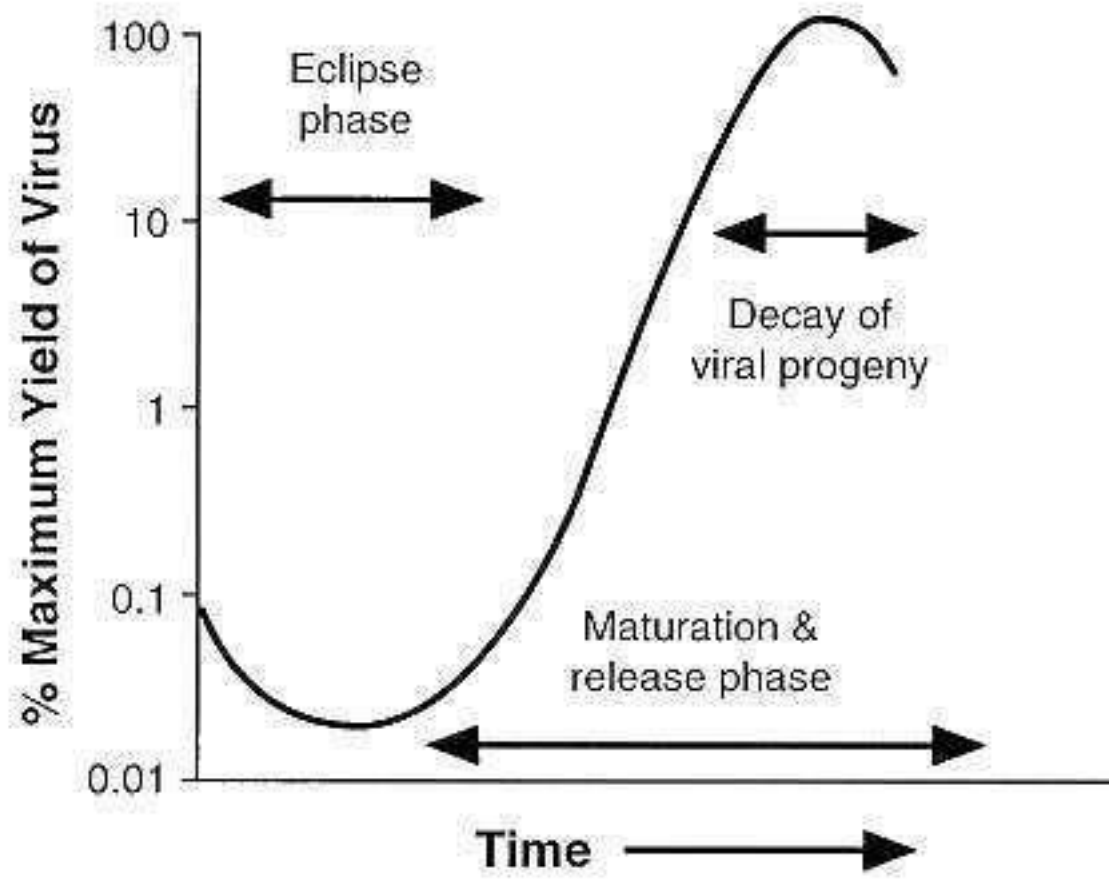
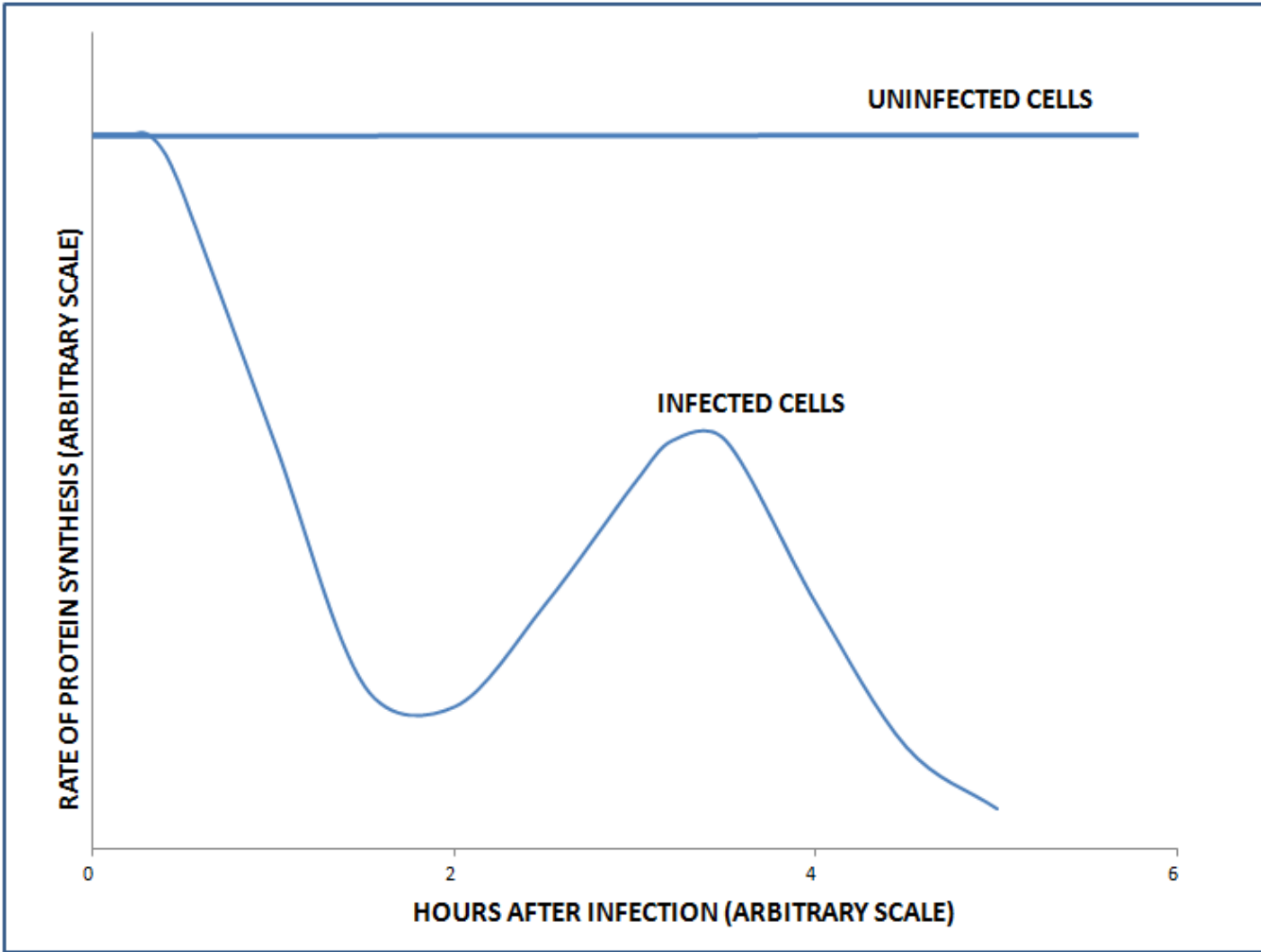


EFFETTI DELLA INFEZIONE VIRALE SULLA CELLULA OSPITE



EFFETTI DELLE INFEZIONI VIRALI SULLA CELLULA OSPITE

1. Alterazioni nella sintesi delle macromolecole cellulari
2. Alterazione della membrana cellulare
3. Alterazioni morfologiche
4. Alterazione del controllo della proliferazione cellulare



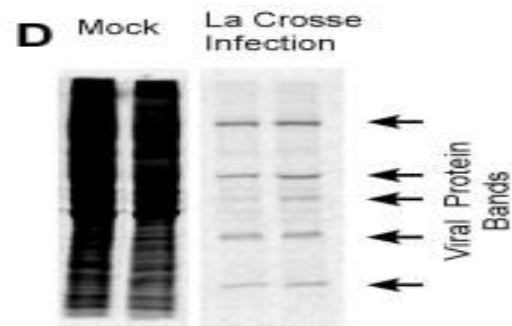
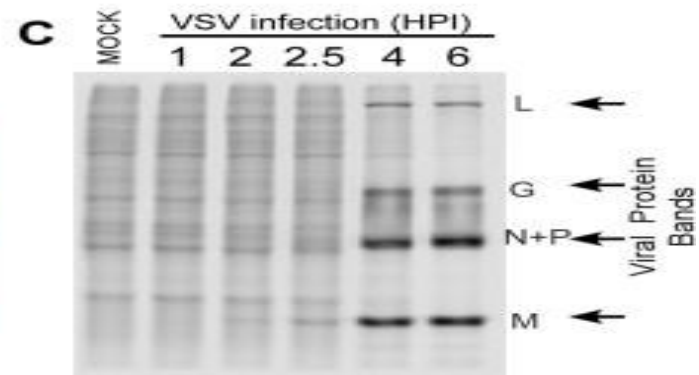
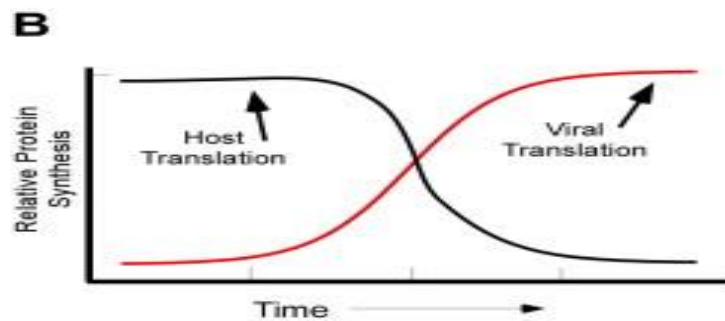
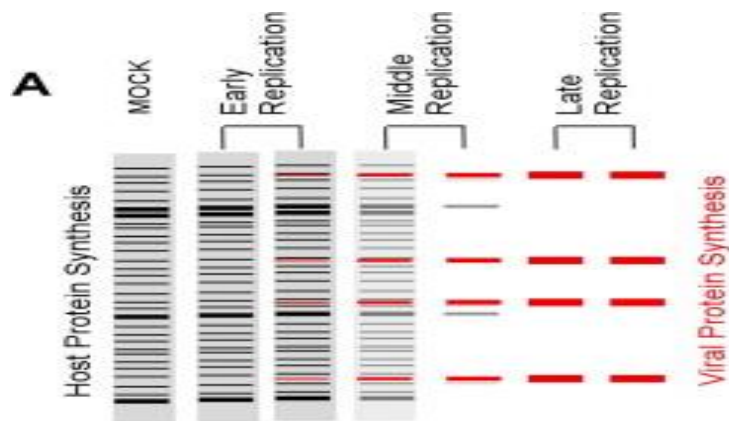
Shutoff

- Most viruses exhibit a phenomenon known as shutoff early in infection
- Shutoff is the sudden & dramatic cessation of most host cell macromolecular synthesis

- A few hours after translation ceases, lysis of the cell occurs

Shutoff

- Most viruses exhibit a phenomenon known as shutoff early in infection
- Shutoff is the sudden & dramatic cessation of most host cell macromolecular synthesis
 - In poliovirus-infected cells, this is the result of the virus 2A protein
 - 2A is a protease which cleaves the p220 component of eIF-4F, a complex of proteins required for cap-dependent translation of mRNAs by ribosomes
 - Since poliovirus RNA does not have a 5' methylated cap but is modified by the addition of the VPg protein, virus RNA continues to be translated
 - In poliovirus-infected cells, the dissociation of mRNAs & polyribosomes from the cytoskeleton can be observed & this is the reason for the inability of the cell to translate its own messages
- A few hours after translation ceases, lysis of the cell occurs

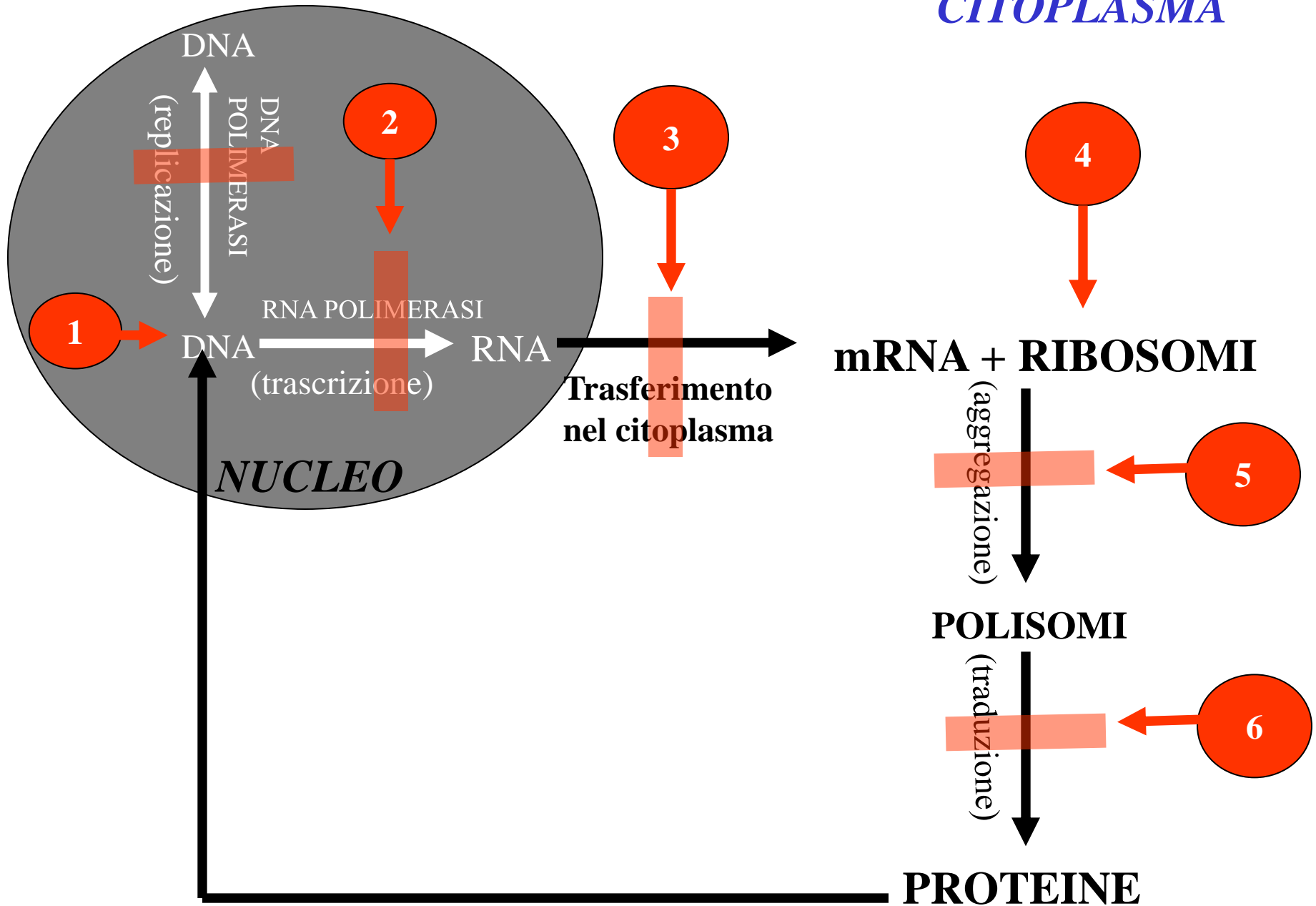


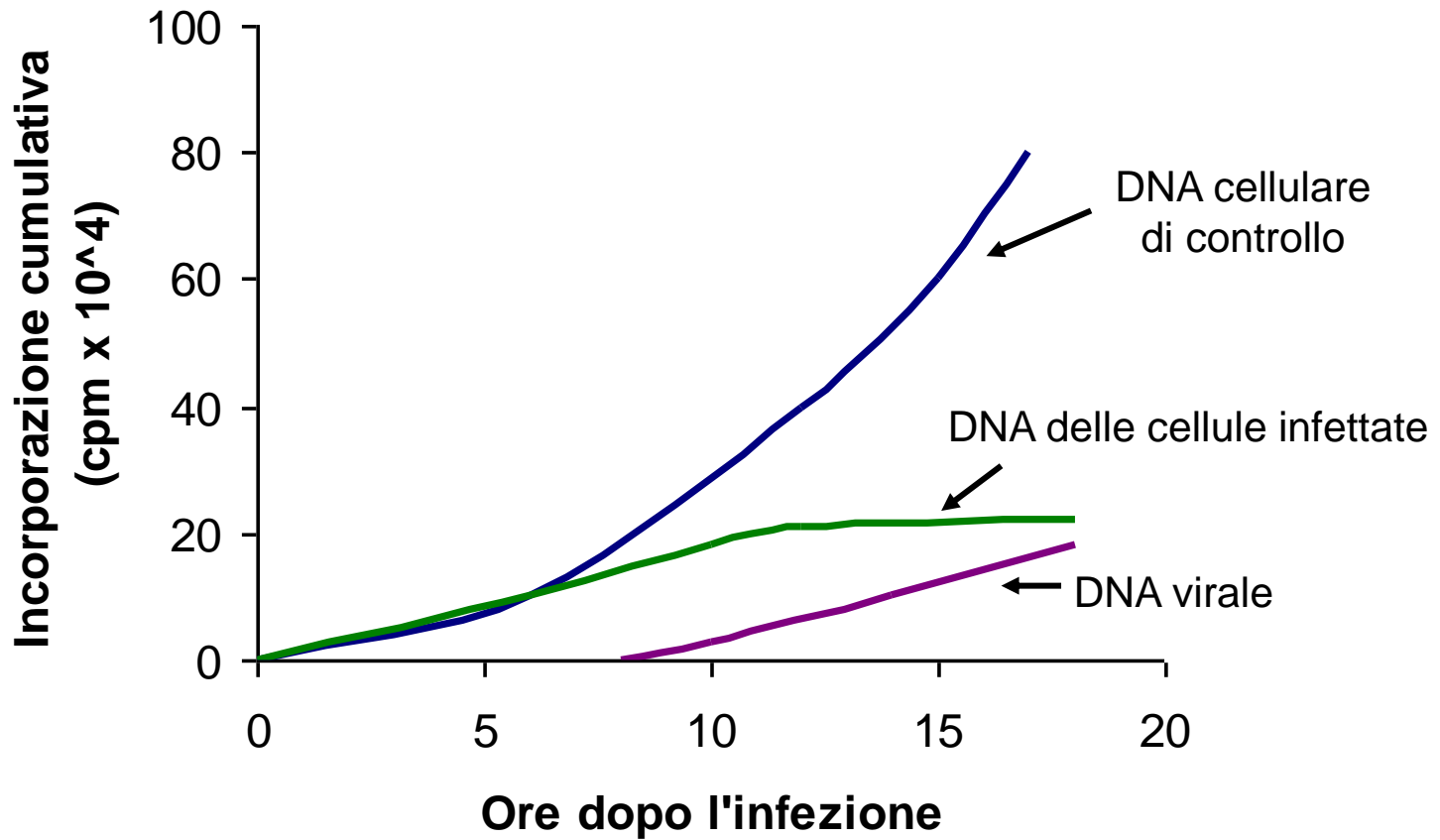
Erin N. Hodges , John H. Connor

Translational control by negative-strand RNA viruses: Methods for the study of a crucial virus/host interaction

Methods null 2012 null

<http://dx.doi.org/10.1016/j.ymeth.2012.09.003>

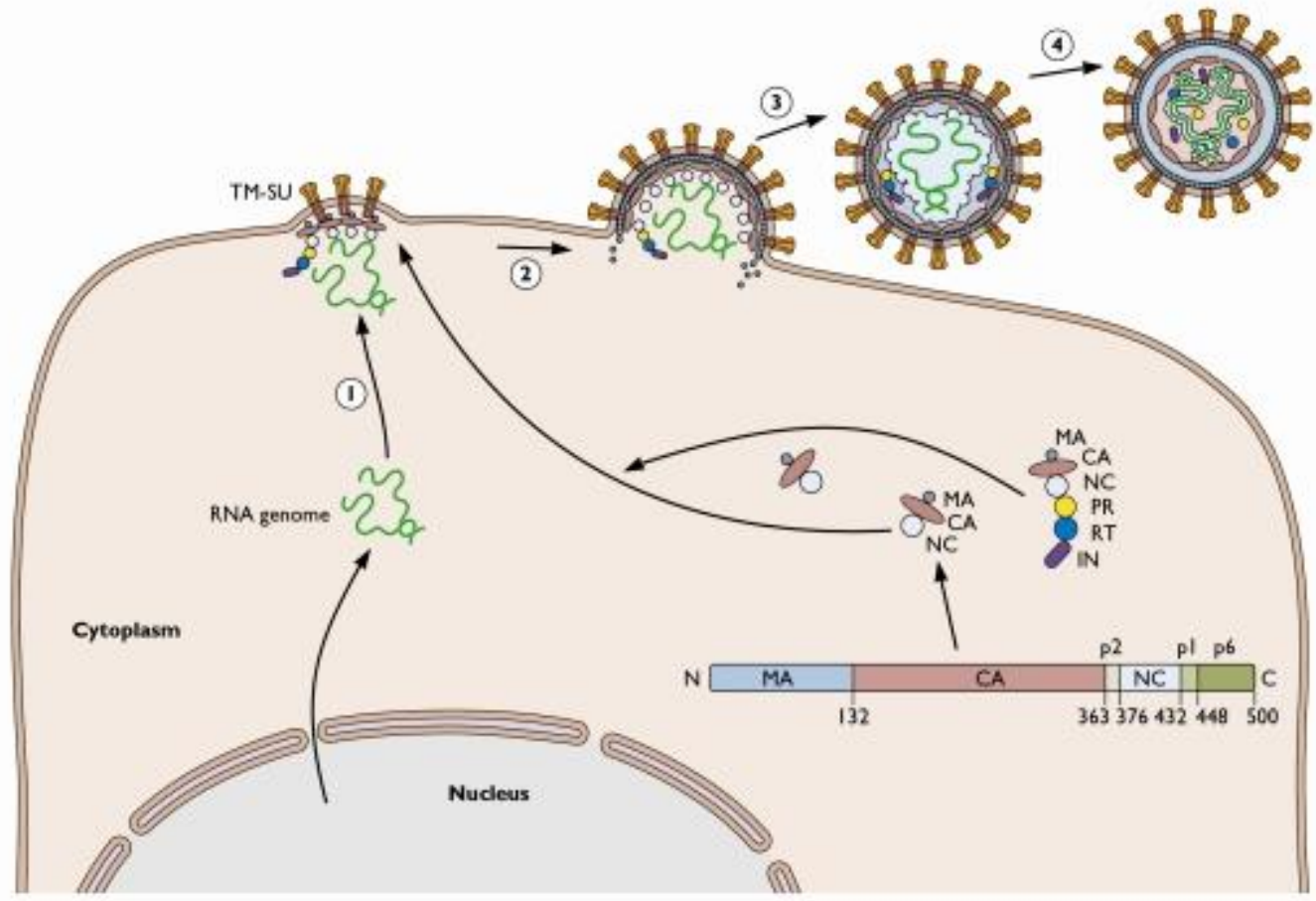


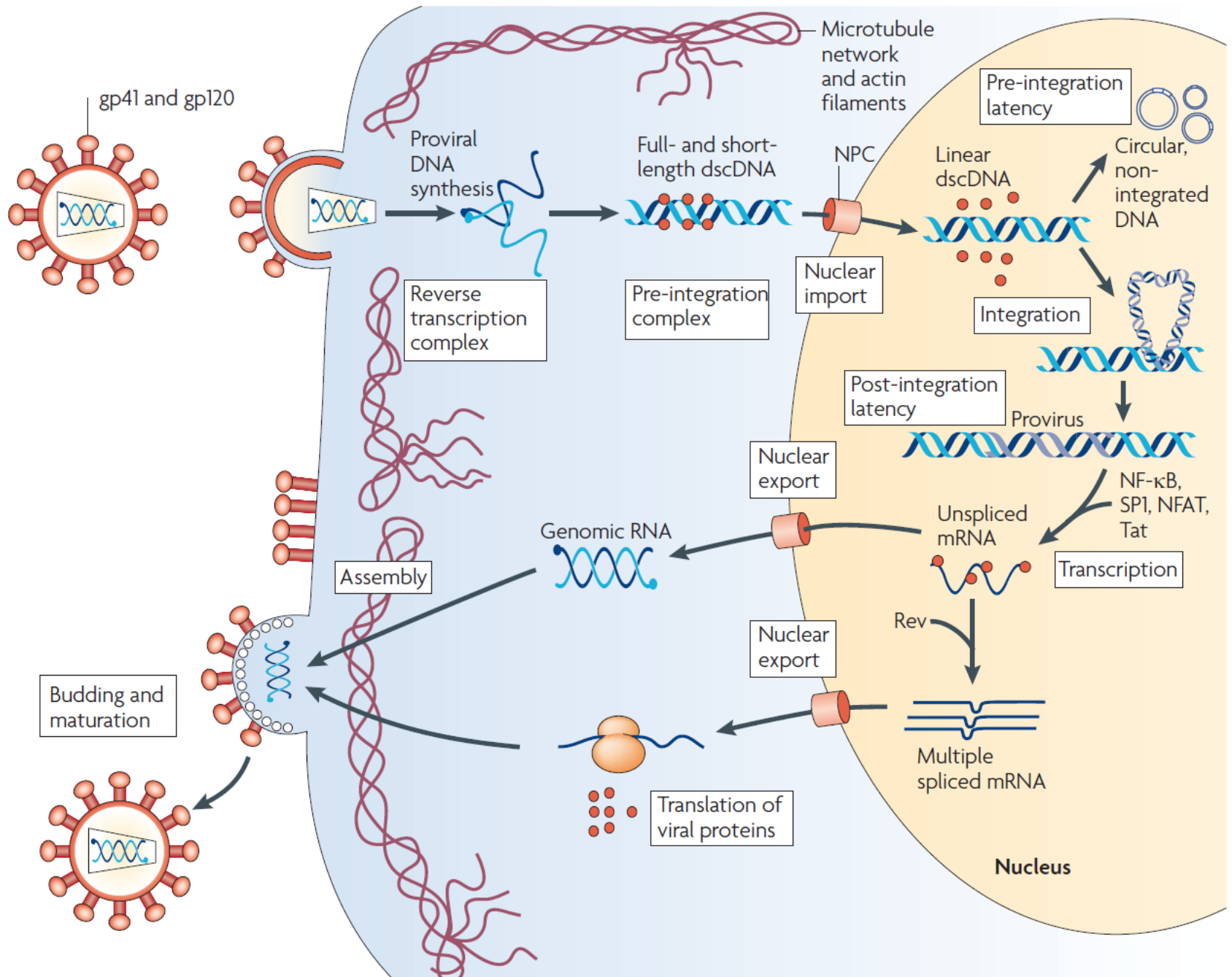


Inibizione della sintesi di DNA cellulare in cellule L infettate con virus dell'aborto equino (un herpesvirus) in presenza di ³H-timidina.

EFFETTI DELLE INFEZIONI VIRALI SULLA CELLULA OSPITE

1. Alterazioni nella sintesi delle macromolecole cellulari
2. **Alterazione della membrana cellulare**
3. Alterazioni morfologiche
4. Alterazione del controllo della proliferazione cellulare

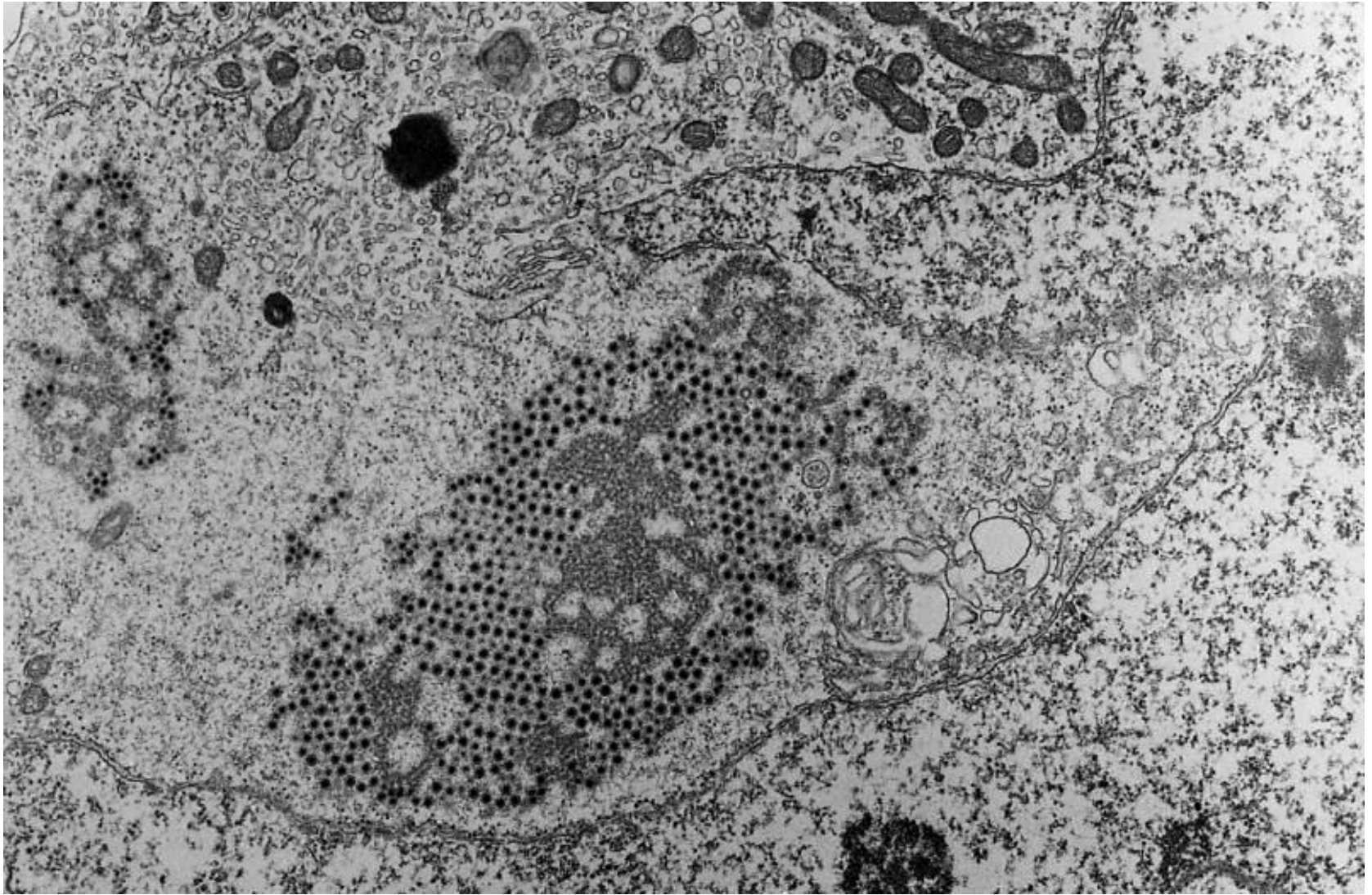




EFFETTI DELLE INFEZIONI VIRALI SULLA CELLULA OSPITE

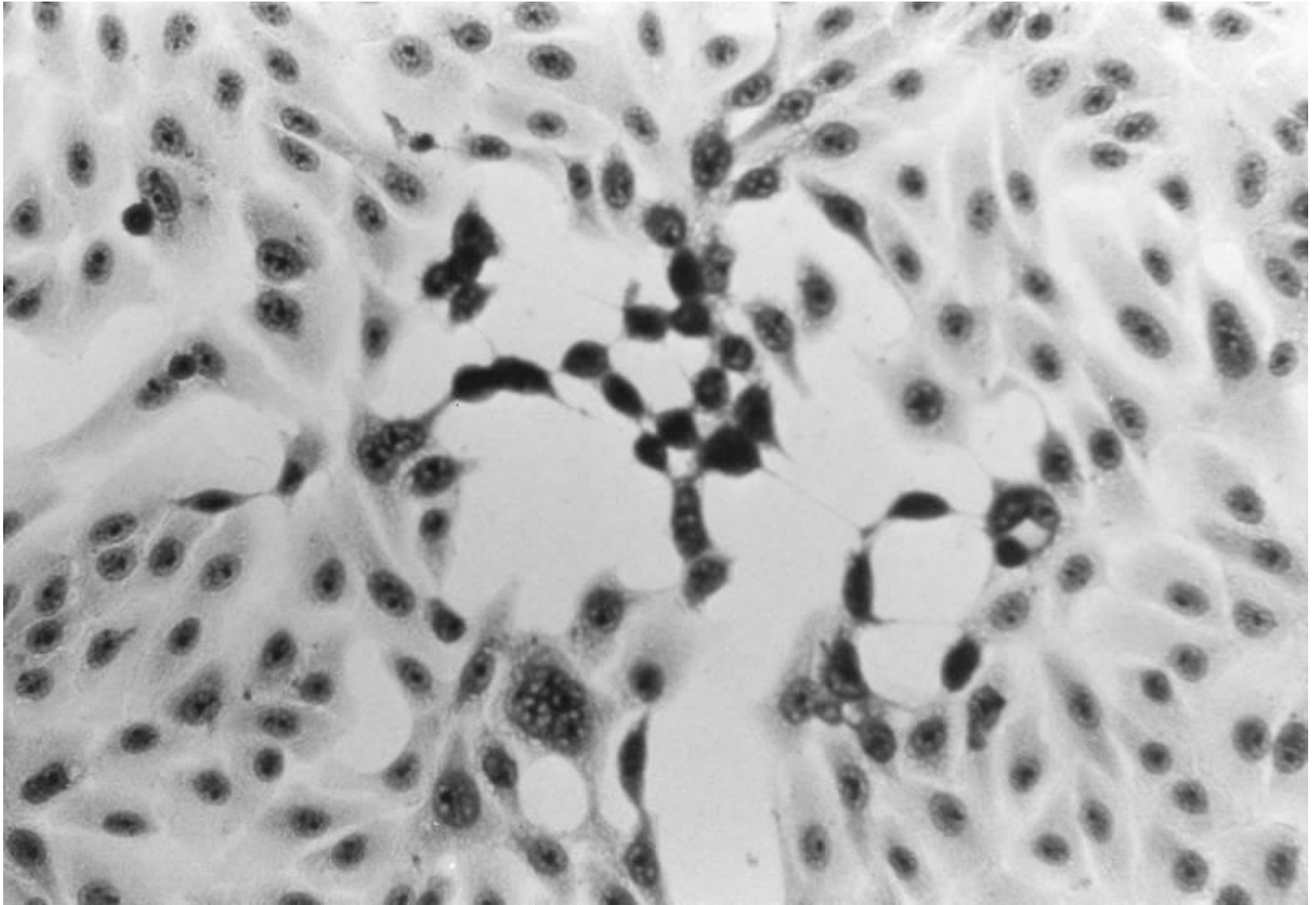
1. Alterazioni nella sintesi delle macromolecole cellulari
2. Alterazione della membrana cellulare
3. **Alterazioni morfologiche**
4. Alterazione del controllo della proliferazione cellulare

The destructive consequences of virus infection for the cell are termed **cytopathic effect**, a term most commonly used to describe the consequences of infection in cultured cells

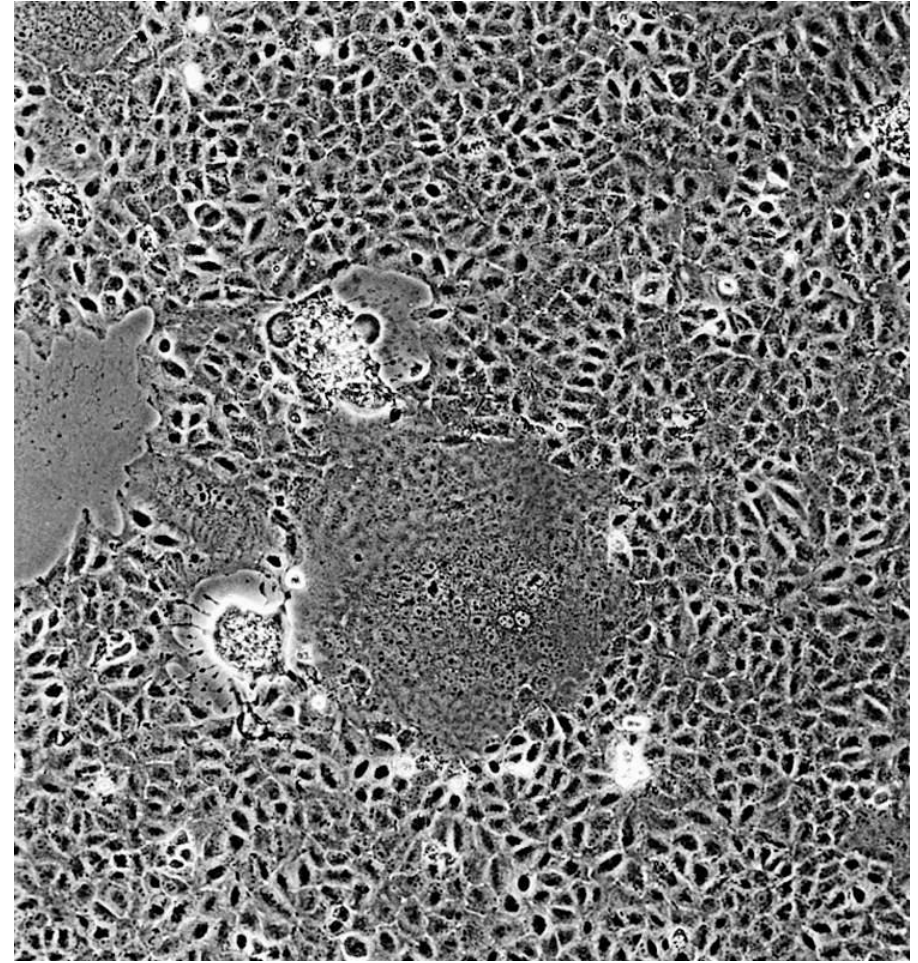
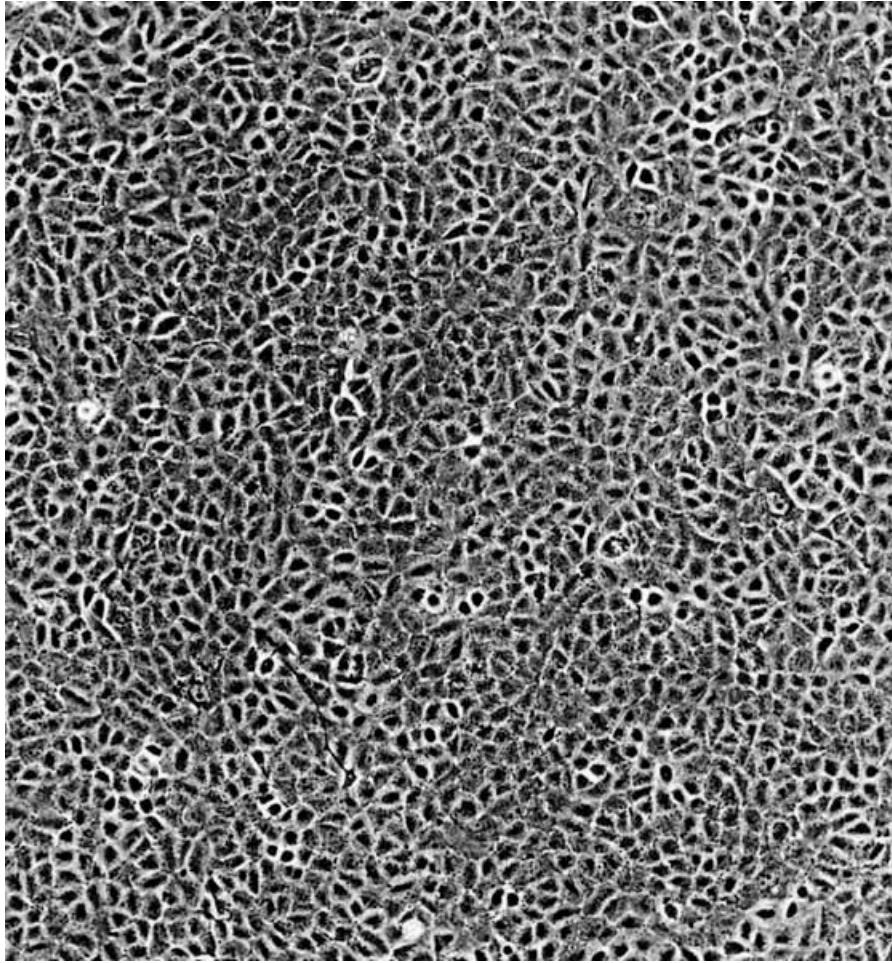


Electron microscope visualization of cytoplasmic “factories” in a cell infected with reovirus.

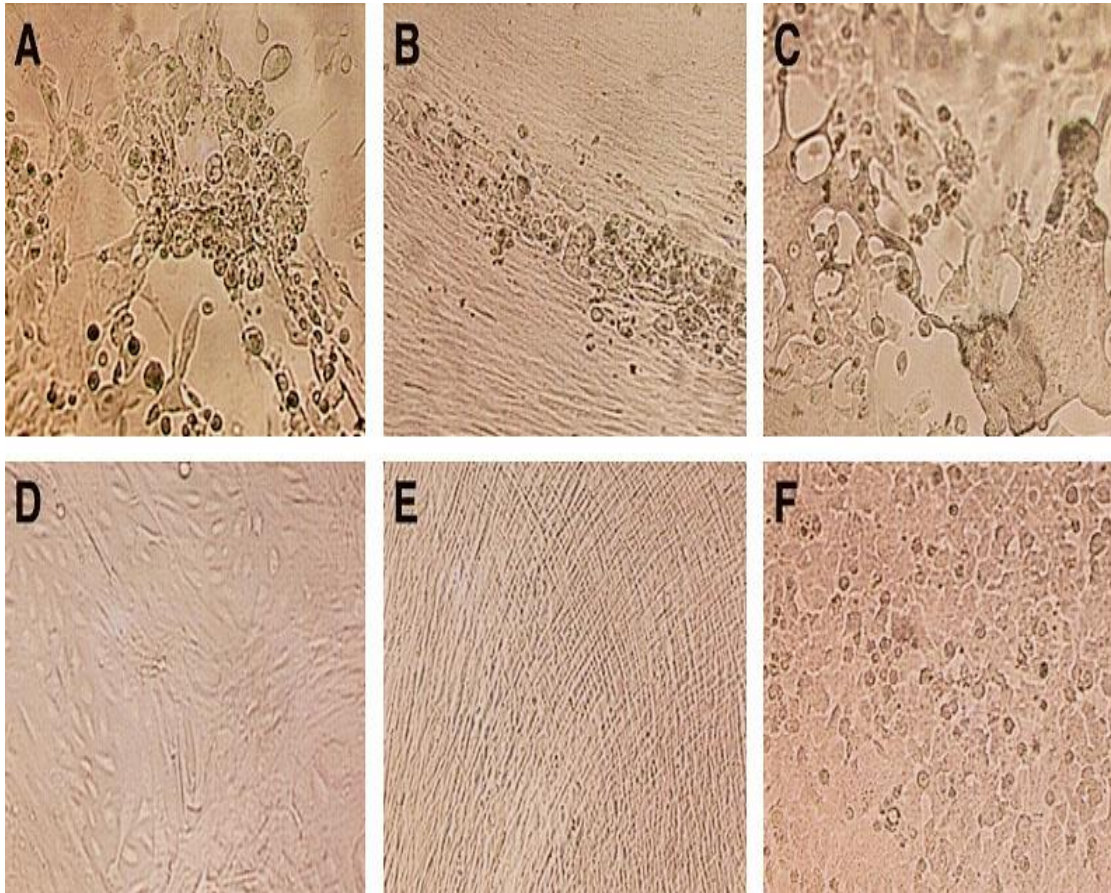
EFFETTO CITOPATICO: CAMBIAMENTO MORFOLOGICO



CPE= arrotondamento delle cellule, rotture dei cromosomi, perdita di
Intracellulari e disaggregazione del citoscheletro



Virus-induced cytopathic effects (CPE). Phase-contrast photomicrographs are shown. *Left:* Uninfected A549 cells, a human lung carcinoma cell line. *Right:* A549 cells infected with measles virus. Measles fuses cells, causing formation of syncytia.



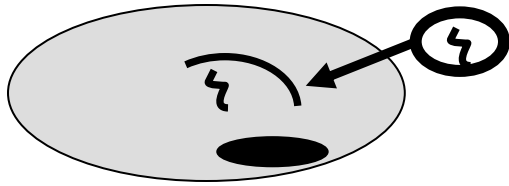
Cytopathic effect caused by viruses growing in cell culture.

Herpes simplex virus growing in primary rabbit kidney cells (**A**); uninfected primary rabbit kidney cells (**D**). Cytomegalovirus growing in human embryonic lung fibroblast cells (**B**); uninfected human embryonic lung fibroblast cells (**E**). Respiratory syncytial virus growing in HEp-2 cells (**C**); uninfected HEp-2 cells (**F**).

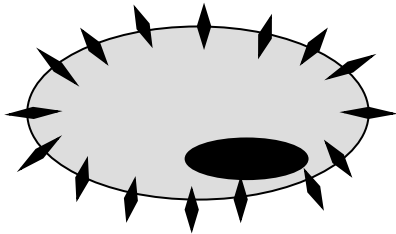
RISPOSTA CELLULARE ALL'INFEZIONE

Virus	Tipo di cellule	Risposta cellulare	Inclusioni
Adenovirus	HeLa	Arrotondamento e aggregazione cellulare	Nucleari
	Embrione di ratto	Trasformazione	Nucleari
Herpesvirus (Herpes simplex)	HeLa	Policariociti (alcuni ceppi), arrotondamento cellulare	Nucleari
Poxvirus (vaiolo)	HeLa	Lento arrotondamento, foci iperplastici	Citoplasmatiche
Picornavirus (Poliovirus)	Rene di scimmia	Lisi cellulare	Nessuna
Orthomixovirus (virus influenzali)	Rene di scimmia	Lento arrotondamento	Nessuna
Paramixovirus (virus parainflenzali)	Rene di scimmia	Fusione delle membrane cellulari, formazione di sincizi	Citoplasmatiche
Coronavirus	Diploidi umane	Minima, raramente sincizi	Nessuna
Togavirus (virus dell'encefalite equina dell'est)	L di topo	Lisi cellulare	Nessuna
Virus della rosolia	Amnios umano	Lento ingrossamento e arrotondamento	Citoplasmatiche
Reovirus	Rene di scimmia	Ingrossamento e formazione di vacuoli	Citoplasmatiche
Virus della rabbia	Rene di hamster	Di solito nessuna	Citoplasmatiche

FORMATION OF FUSED MULTINUCLEATED CELLS



1. INFECTION

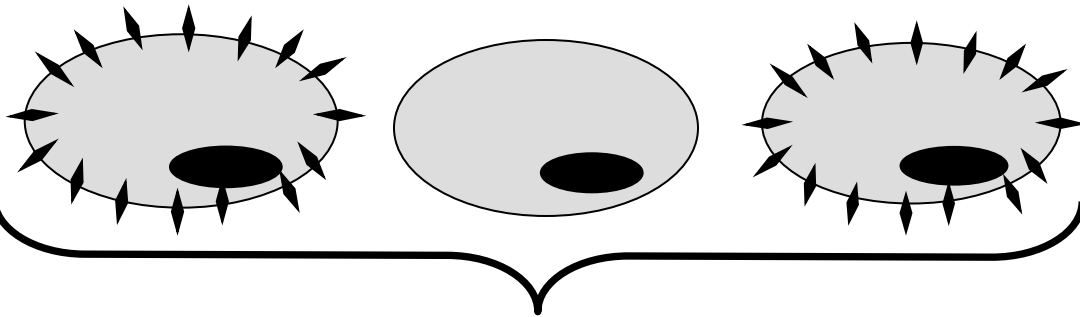


2. PRODUCTION OF VIRAL FUSION PROTEINS

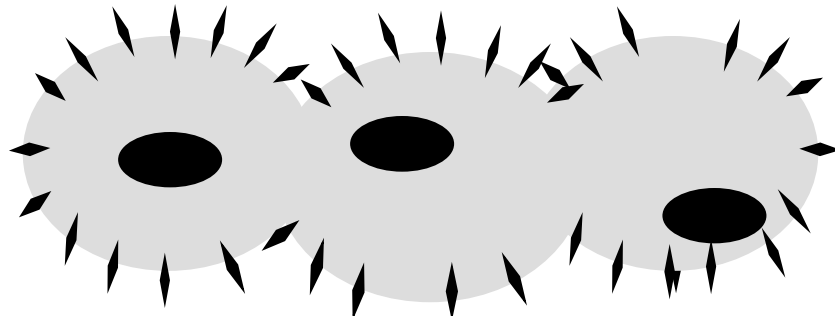
Infected

uninfected

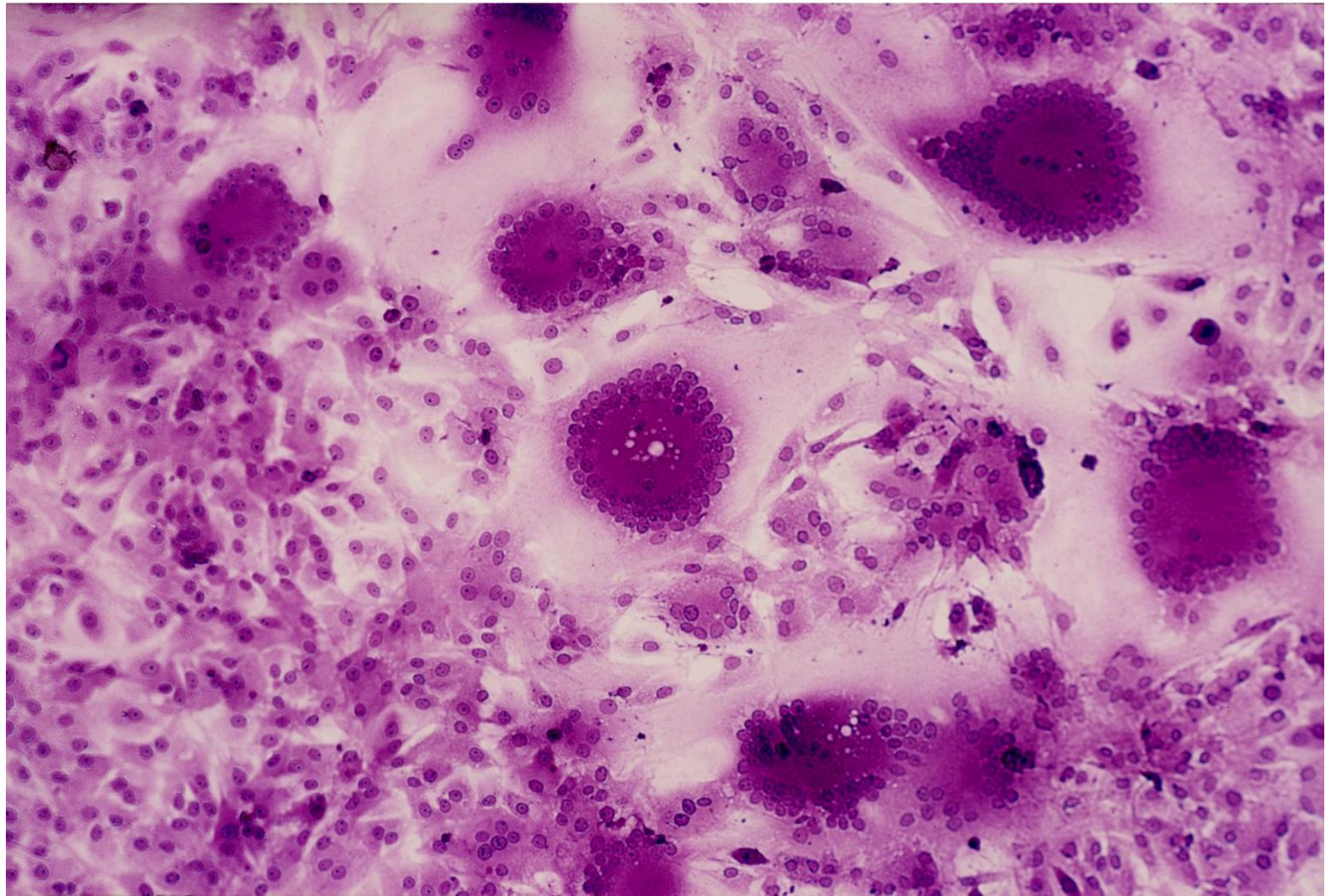
infected



3. FUSION OF CELLS



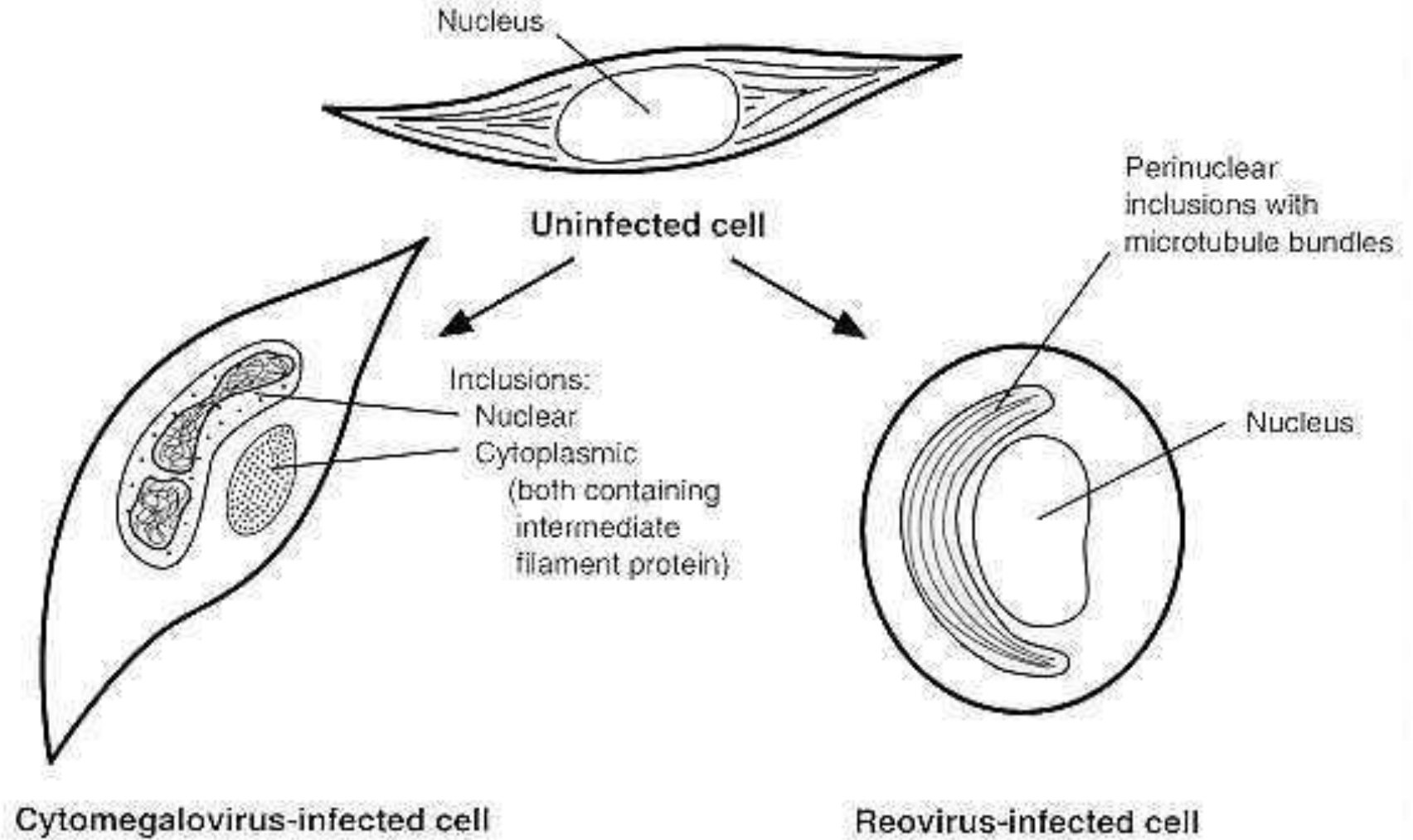
**4. MULTINUCLEATED
SYNCYTIAL CELL**



FORMAZIONI DI INCLUSIONI



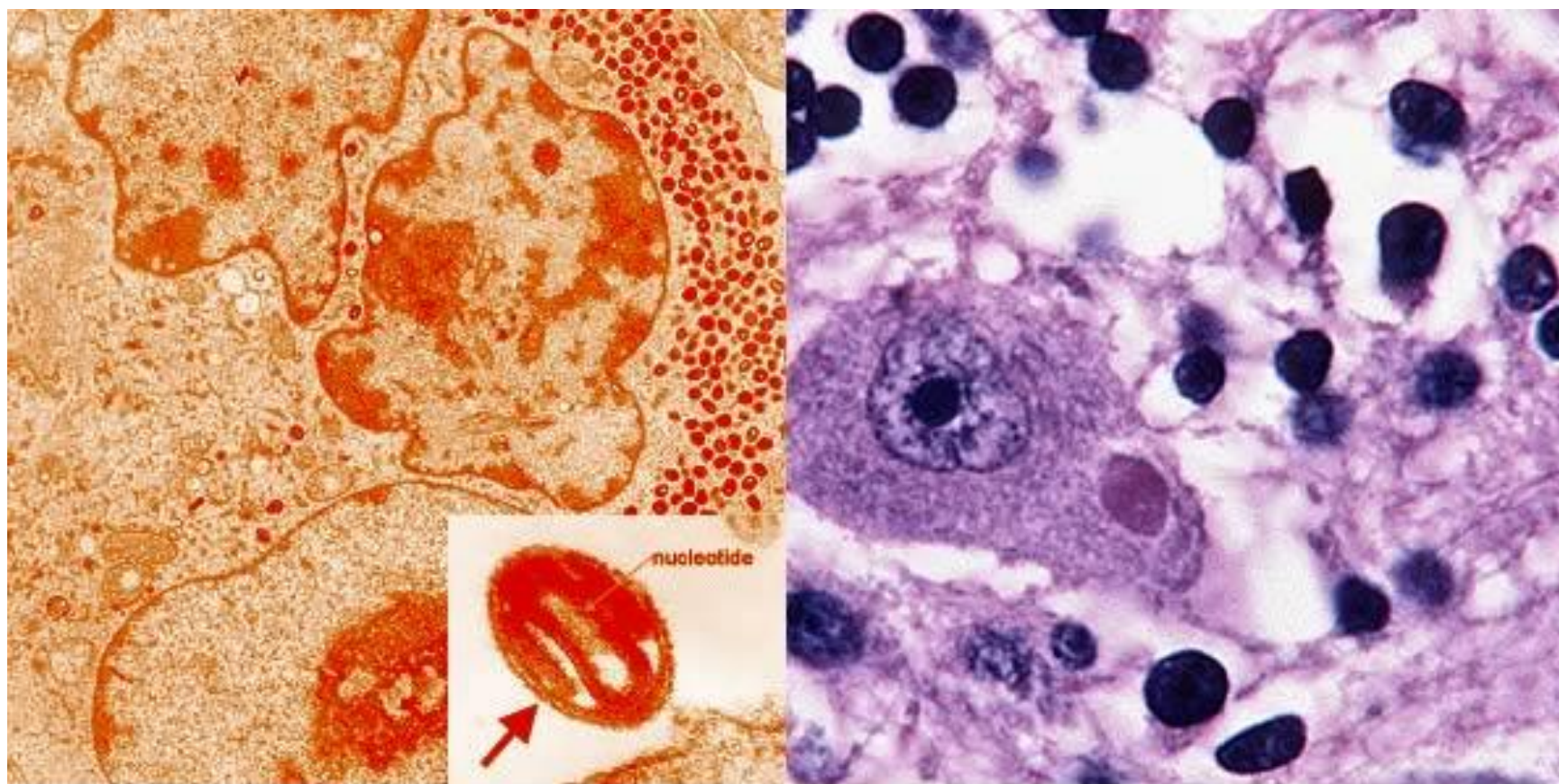
Le inclusioni si localizzano nel nucleo o nel citoplasma. Si tratta di masse amorfe costituite da ammassi di proteine virali non montate e/o materiale cellulare alterato



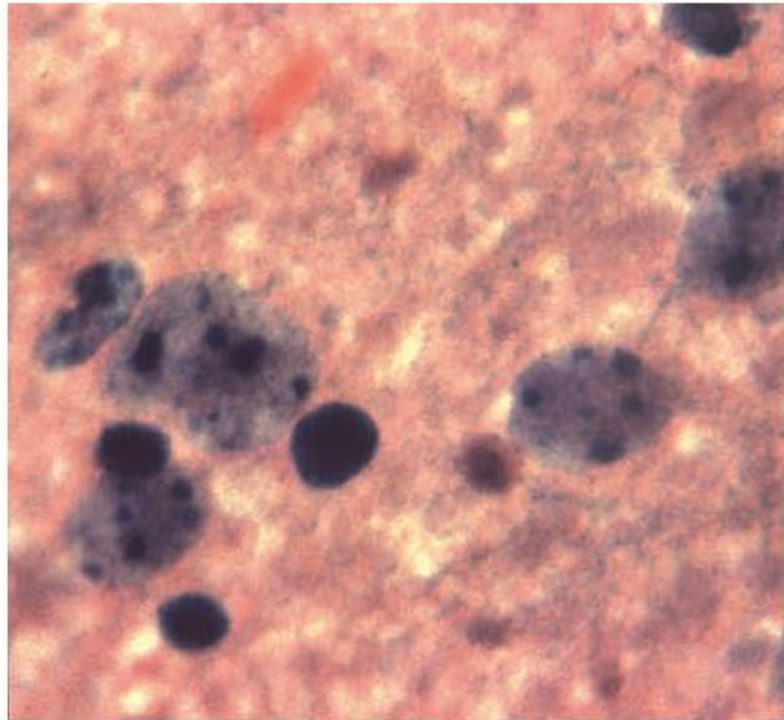
EFFETTO DELLA REPLICAZIONE SULLA CELLULA OSPITE

CORPI DI INCLUSIONE CAUSATI DA ALCUNI VIRUS

	Localizzazione nella cellula		
	Nucleo	Citoplasma	
Herpes simplex	+	-	Corpi di Cowdry
Citomegalovirus	+	+	
Virus della rabbia	-	+	Corpi del Negri
Virus del vaiolo	-	+	Corpi del Guarnieri
Adenovirus	+	-	
Morbillo	+	+	
Papovavirus	+	-	
Virus della febbre gialla	-	+	Corpi del Torres



Corpi inclusi prodotti durante la replicazione del virus. A sinistra corpi del Guarnieri causati dal vaiolo; a destra corpi del Negri prodotti dal virus della rabbia.



Formazione di inclusioni intracellulari (corpi del Negri)
in cellule infettate dal virus della rabbia

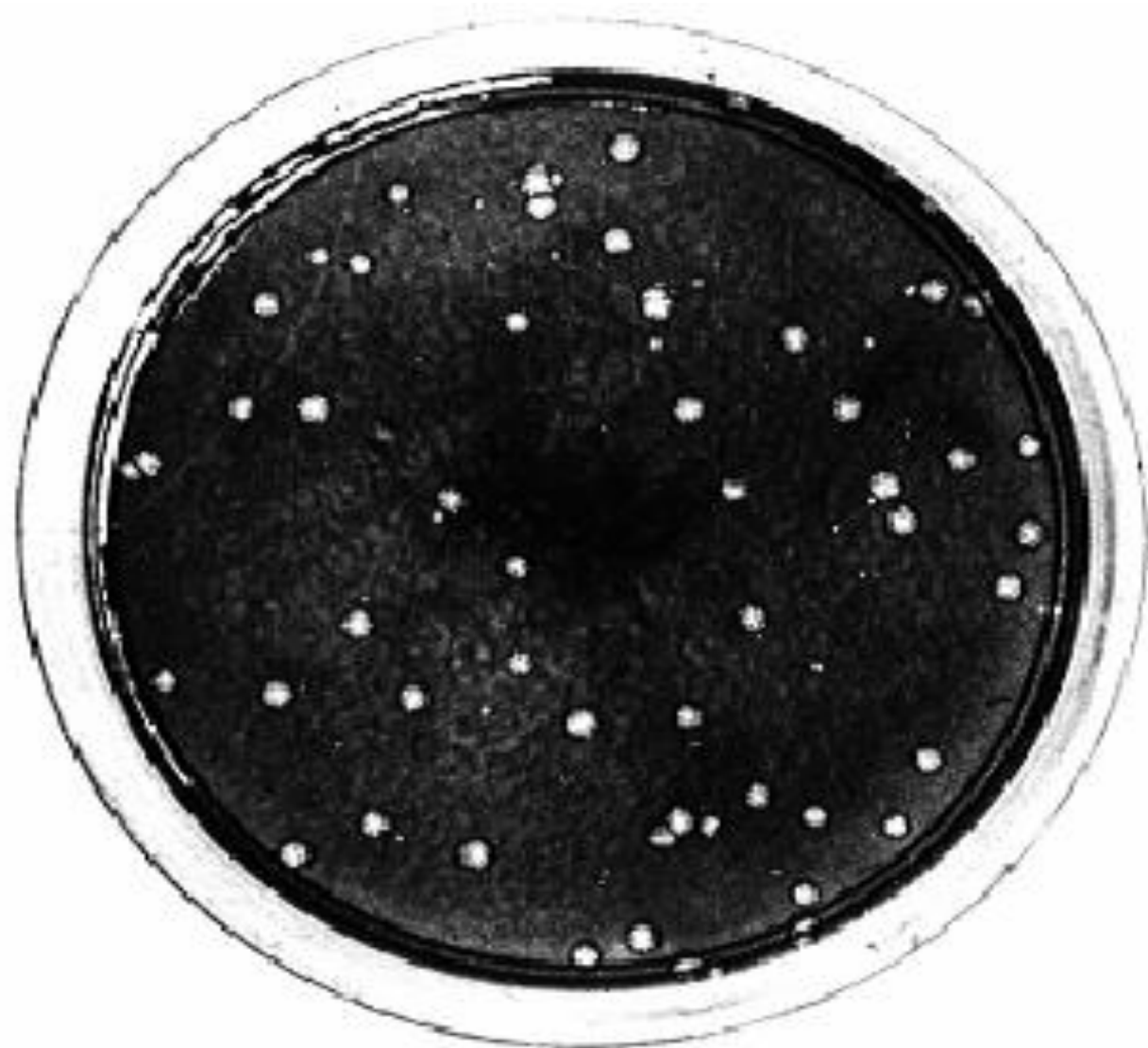


Figura 48.3.
Placche di citolisi provocate da un poxvirus (virus vac-
cinico) in un monostrato di cellule (dimensioni reali)

EFFETTI DELLE INFEZIONI VIRALI SULLA CELLULA OSPITE

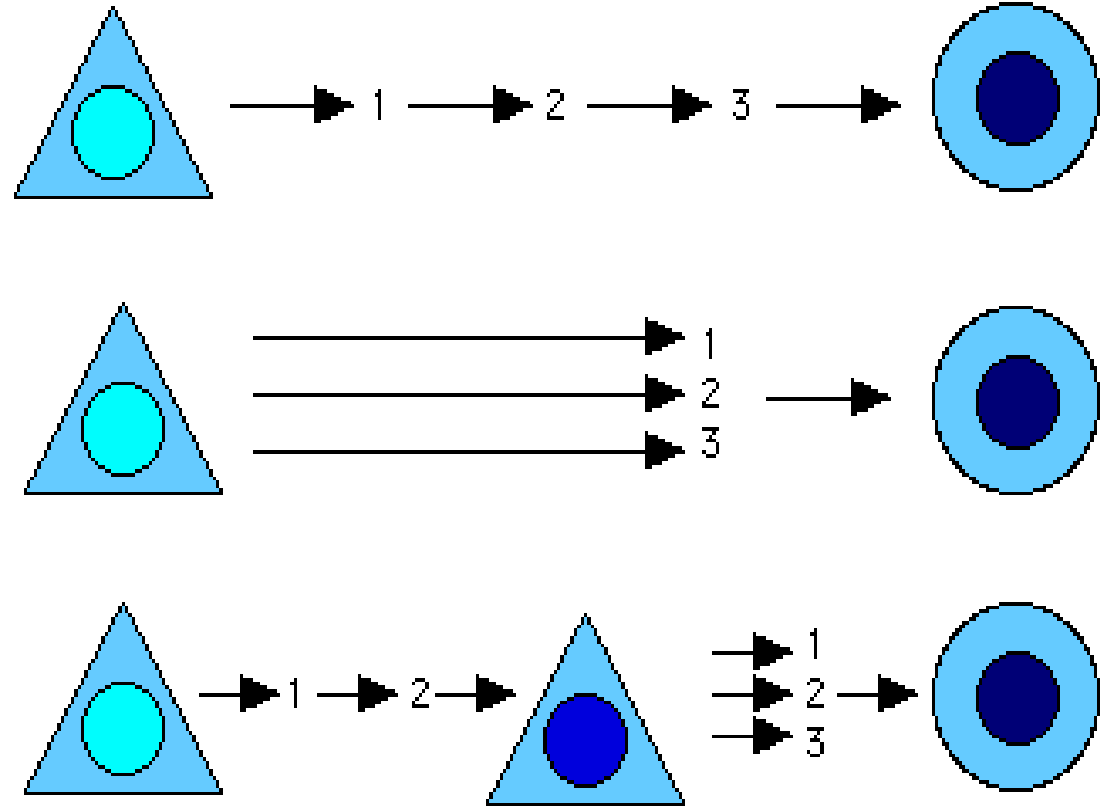
1. Alterazioni nella sintesi delle macromolecole cellulari
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Mechanism of transformation

In vivo and epidemiological studies indicate that transformation is a **multi-step process** involving: **initiation**, **promotion** and **progression**

Normal Cell

Neoplastic Cell

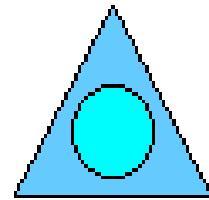


Mechanism of transformation

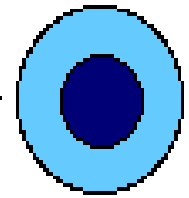
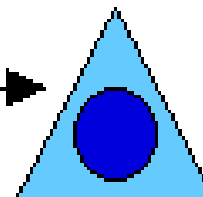
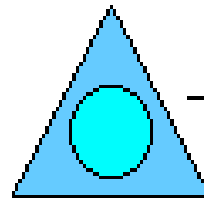
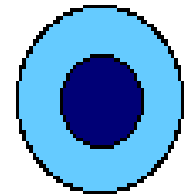
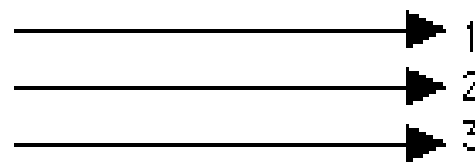
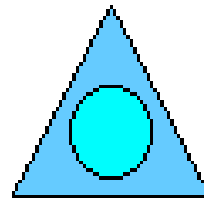
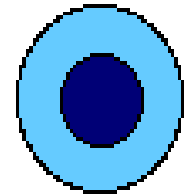
In vivo and epidemiological studies indicate that transformation is a **multi-step process** involving: **initiation**, **promotion** and **progression**

Transformation involves gene mutations, amplification of cells containing these mutations and further changes leading to transformation

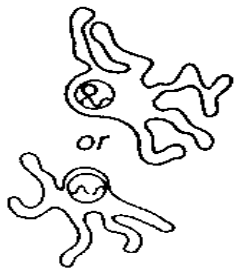
Normal Cell



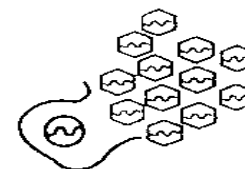
Neoplastic Cell



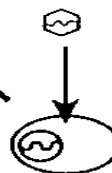
Virus are likely responsible for 20% human cancers and are a risk factor second only to tobacco



Infected cells become transformed or oncogenic due to viral effects. Whole viral genome may not be present



Infected cell is killed rapidly



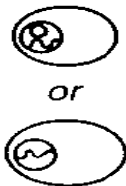
Virus-infected cell

Transforming/
oncogenic

Acute/lytic

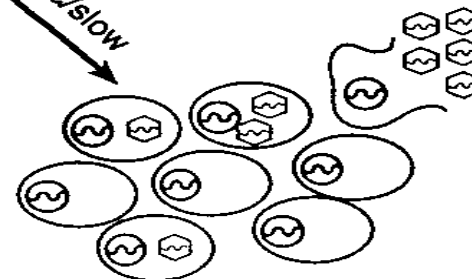
Latent/proviral

Persistent/chronic/slow



or

Reactivation



Whole viral genome maintained as free or integrated DNA with very limited expression

Most cells are not killed
Not all cells are infected

Possibili effetti dei virus sulle cellule animali

