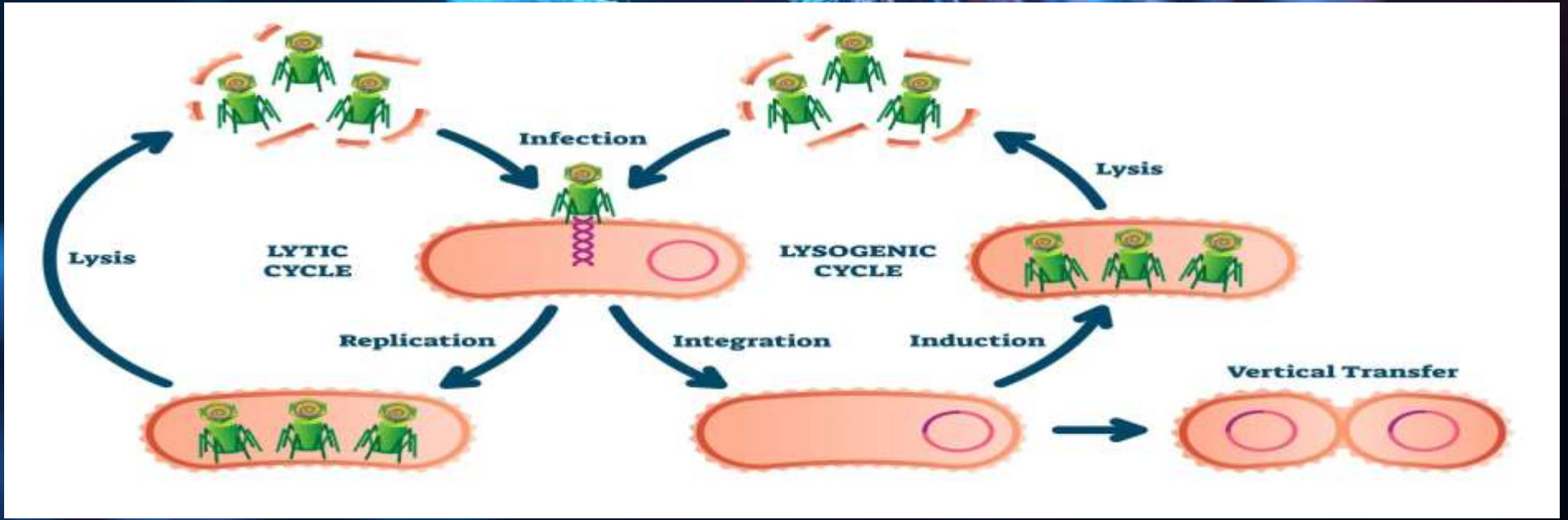
Lysogenic Cycle

SUBMITTED BY: ARUNA SALEEM
ROLL NO.: 25380
CLASS: 1ST SEMESTER, B.SC.
COLLEGE: GOVT. DEGREE COLLEGE SUMBAL
SUBJECT: BOTANY

Introduction

The lysogenic cycle is a viral replication process in which the viral genome integrates into the host cell DNA, remaining dormant for an extended period. This cycle allows the virus to persist without destroying the host cell immediately, playing a crucial role in viral survival and genetic diversity.

01 Overview of the Lysogenic Cycle



Definition and significance

The lysogenic cycle involves the integration of viral DNA into the host genome, forming a *prophage*. This dormant state enables the virus to replicate passively with the host cell, ensuring persistence without causing immediate harm. It is essential for understanding viral latency and long-term infection dynamics.

Comparison with lytic cycle

Unlike the lytic cycle, where viruses rapidly replicate and lyse the host cell, the lysogenic cycle maintains the host cell alive. The key difference lies in this dormancy phase, allowing the virus to evade the immune response and reactivate under specific conditions for active replication.

Conditions favoring lysogeny

Lysogeny is favored under conditions where host cells are healthy and resources are abundant, allowing the virus to persist without killing the host. Environmental stressors such as UV light, chemicals, or nutrient deprivation can influence the viral choice to remain dormant or enter the lytic cycle. This strategy maximizes viral survival during unfavorable conditions.

Integration of viral DNA into host genome

During lysogeny, the viral DNA integrates into the hosts chromosome as a *prophage*. This integration is catalyzed by specific enzymes that enable stable insertion without disrupting host cell functions. The prophage replicates passively with the host genome, enabling the virus to persist through host cell divisions.

Maintenance of prophage state

The prophage remains dormant due to regulatory repression of viral genes required for replication. Repressor proteins prevent the activation of the lytic cycle, ensuring stable coexistence within the host. Maintenance of this state is critical for avoiding host cell damage while preserving the viral genome.

Induction triggers and transition to lytic cycle

Environmental stress or DNA damage can trigger the prophage to exit lysogeny, initiating the lytic cycle. Induction activates viral genes, leading to replication, assembly, and eventual lysis of the host cell. This transition allows rapid viral propagation when conditions become unfavorable for dormancy.

Conclusions

The lysogenic cycle represents a sophisticated viral survival strategy balancing dormancy and active replication. By integrating into the host genome and maintaining a prophage state, viruses can persist without immediate destruction of the host. Understanding this mechanism is vital for insights into viral latency, evolution, and potential therapeutic interventions.

THANK YOU

PRESENTED BY ARUNA SALEEM