

Clamping the tail fiber



AI Overview

Clamping the tail fiber refers to the stabilization or attachment of bacteriophage tail fibers to the host or viral baseplate, ensuring proper binding and infection. Structure and Function of Tail Fibers Bacteriophage T4 has long tail fibers (LTFs) that extend from the baseplate and are essential for host recognition and attachment. Each LTF is composed of multiple proteins: gp34 forms the "thigh," gp35 the "knee," gp36 the upper "lower leg," and gp37 the "foot," which directly interacts with bacterial receptors such as lipopolysaccharide (LPS) and outer membrane protein C (OmpC) on *Escherichia coli*. The distal tip of gp37 contains a trimeric structure that binds these receptors, allowing the phage to attach and move on the bacterial surface.

Mechanism of Clamping The term "clamp" in this context can be understood as the mechanical stabilization of the tail fiber during host attachment. The tail fibers act like articulated legs, with flexible hinges that allow the phage to adjust its position on the bacterial surface. When the fibers engage with receptors, they form a stable attachment, preventing detachment due to Brownian motion or environmental forces.

Biophysical studies using Atomic Force Microscopy have shown that gp37 fibers have a radial stiffness of ~ 0.08 N/m and a breaking force of ~ 120 pN, providing sufficient mechanical strength to maintain attachment.

Assembly and Stabilization Tail fibers are preassembled and attached to the phage baseplate through a chaperone-assisted process, ensuring correct folding and functional orientation. This assembly effectively "clamps" the fibers in place, allowing them to act as a pivot for the phage to explore the bacterial surface and locate optimal infection sites. The trimeric nature of gp37 ensures that at least three fibers are engaged during initial host interaction, providing both mechanical stability and redundancy.

Functional Implications Clamping the tail fiber is critical for efficient infection, as it allows the phage to maintain contact with the host while the basepla...

Article Content

Tail fiber Definition for Microbiology | Fiveable

Tail fibers determine the host range of a bacteriophage by binding to specific receptors on bacterial cells. They undergo conformational changes upon binding, facilitating attachment and subsequent insertion

Phage Proteins Required for Tail Fiber Assembly Also Bind

The complicated nature of fiber structures necessitates the participation of intra- or intermolecular chaperones for their proper folding and assembly (5 – 7). Tail fiber assembly (Tfa)

Ares_viral_fibers_AAM

Viral fibers play a central role in many virus infection mechanisms since they recognize the corresponding host and establish a mechanical link to its surface. Specifically, bacteriophages have

Understanding Bacteriophage Tail Fiber

In this review, we comprehensively summarize how the tail fibers of the T4 phage recognize host surface receptors at single-molecule and atomic levels.

Targeting mechanisms of tailed bacteriophages

This innovative paper describes how the host range of R-type pyocins can be reprogrammed by replacing parts of the tail fibres between

Towards a complete phage tail fiber structure atlas | bioRxiv

This method segments the tail fiber sequences into smaller fractions, preserving domain boundaries. These segments are then predicted in parallel using AF2M and assembled into a full

Tail fiber function and structure | Bacteriophage T4 Tail

Bacteriophages T2, T4 and T6 were the first members of what has come to be described as the T-even family of viruses, more properly the Myoviridae (Kutter

ADSS HANGING SUSPENSION CLAMPS

ADSS HANGING SUSPENSION CLAMPS DIELECTRIC The Hubbell ADSS Dielectric Suspension Clamp is a great choice when installing ADSS (All Dielectric Self-Support) aerial fiber optic cable

Morphogenesis of the T4 tail and tail fibers

Remarkable progress has been made during the past ten years in elucidating the structure of the bacteriophage T4 tail by a combination of three-dimensional image reconstruction from

Structural Insights into the Chaperone-Assisted Assembly of a ...

Structural analysis enabled us to propose the assembly mechanism of phage tail fibers, in which the chaperone first protects the intertwined and repetitive distal moiety of each fiber subunit,

Structural Insights into the Chaperone-Assisted Assembly of a ...

At the first step of phage infection, the receptor-binding proteins (RBPs) such as tail fibers are responsible for recognizing specific host surface receptors. The proper folding and assembly of

Clamping part for novel optical fiber preforms

An optical fiber preform and clamping part technology, which is applied in the field of clamping parts for new optical fiber preforms, can solve

Phage Proteins Required for Tail Fiber Assembly Also Bind

Tail fiber assembly (Tfa) proteins are a very large family of proteins that serve as chaperones for fiber folding in a wide variety of phages that infect diverse species.

RBPseg: Toward a complete phage tail fiber structure atlas

Using this approach, we generated complete tail fiber models, validated by single-particle cryo-electron microscopy of five fibers from three phages. A structural classification of 67 fibers

Fiber tail fiber characteristics

Pigtail, also known as pigtail, has only one end with a connector, and the other end is a broken end of a fiber optic cable core. It is connected to other

Functions and properties related to the tail fibers of bacteriophage T4 ...

It is shown that adsorbability of T4 is regularly correlated with the extended state of the tail fibers, suggesting that in T4 fiber extension is a necessary condition for adsorption. Furthermore the

Fiber cable termination

Fiber Optic cable termination is the addition of connectors to each optical fiber in a cable. The fibers need to have connectors fitted before they can attach to other equipment.

What Are Tail Fibers and Why Are They Important?

Tail fiber proteins can also be used as biosensing molecules to detect particular bacterial pathogens. Studying tail fibers contributes to fundamental research into host-pathogen interactions,

Understanding Bacteriophage Tail Fiber

The exact mechanisms of how the tail fiber interacts with the receptor at the molecular/atomic level are critical for engineering phages with reprogrammed host ranges. The advancement of technologies

Bacteriophage T4 long tail fiber domains

Bacteriophage T4 initially recognizes its host cells using its long tail fibers. Long tail fibers consist of a phage-proximal and a phage-distal rod, each around 80 nm long and attached to each

RBPseg: Toward a complete phage tail fiber structure atlas

Here, we introduce RBPseg, a method that combines monomeric ESMFold predictions with a structural- based domain identification approach, to divide tail fiber sequences into

Bacteriophage Tail Fibers, Tailspikes and Host Cell Receptor ...

In this review, we discuss what is known about the detailed structure and function of the different long tail fiber domains.

Video: How to Create Perfect Hackle-Fiber Fly Tails

Many fly patterns call for tails made from the fibers of a single hackle feather. Here, Tim demonstrates the best technique for ensuring that you choose

National Center for Biotechnology Information

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

Understanding Bacteriophage Tail Fiber Interaction with

In this review, we comprehensively summarize how the tail fibers of the T4 phage recognize host surface receptors at single-molecule and atomic

(PDF) Towards a complete phage tail fiber structure atlas

The partial phage tail fiber atlas. a) Network connecting the TC with phage family or 482 subfamily. Node size is proportional to number of proteins

Major tail proteins of bacteriophages of the order Caudovirales

Technological advances in cryo-EM in recent years have given rise to detailed atomic structures of bacteriophage tail tubes—a class of filamentous protein assemblies that could

Lashed Aerial Installation of Fiber Optic Cable

an existing lashed fiber optic or copper cable. This method of aerial cable installation, “overlapping,” is attractive because the expense of providing a separate suspens

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