近年抗结核药物治疗研究中，发现多种新型抗生素，如利福喷丁、莫西沙星等，这些药物在一定程度上提高了结核病的治疗效果。但是，结核病的耐药性问题仍然存在，使得开发新的、有效的治疗药物仍然是迫切需要解决的问题。噬菌体是细菌的病毒，可以被用作新型抗生素的先导物，用于治疗耐药性结核病。分枝杆菌噬菌体广泛存在于自然界，是研究噬菌体-宿主相互作用的理想模型。本文将研究分枝杆菌噬菌体的整合及裂解机理，以期为结核病治疗新药的开发提供新的思路和启示。

噬菌体是细菌的病毒，可以被用作新型抗生素的先导物，用于治疗耐药性结核病。分枝杆菌噬菌体广泛存在于自然界，是研究噬菌体-宿主相互作用的理想模型。本文将研究分枝杆菌噬菌体的整合及裂解机理，以期为结核病治疗新药的开发提供新的思路和启示。
Tyrosine recombinases are catalytic enzymes that mediate site-specific DNA recombination. They facilitate the exchange of genetic material between two DNA molecules at specific sites, a process essential for various biological functions such as genome rearrangements and genetic recombination.

Serine recombinases are a class of DNA recombinases that catalyze the exchange of DNA segments to the extent that the two DNA molecules are used as substrates. The reaction is known as two-strand concatenation.

DNA is a critical molecule in biological systems, responsible for storing genetic information and transmitting it through generations. The ability of recombinases to mediate DNA recombination provides a mechanism to introduce genetic diversity into populations, which is essential for evolutionary processes and adaptation.

The reaction catalyzed by recombinases is known to be highly specific, with the recombinase recognizing and binding to specific DNA sequences to initiate the recombination process. This specificity is crucial for ensuring that recombinations occur at the desired sites and do not disrupt the function of other genes in the genome.
体的继续合成,导致裂解。孔素基因表达降低时,与仅裂解素基因的过度表达无明显差别,即不抑制大肠杆菌的生长,除非外加氯仿;而穿孔素基因的过度表达对大肠杆菌的生长却有严重影响,可导致致死类型,如
放。这种双成分裂解系统在
异性的释放到外周胞质。这为新药开发提供了新的思路。

有助于新药开发。某些分枝杆菌噬菌体的特异尾部蛋白可
突变体,说明即使在异源系统中,穿孔素也允许裂解素非特
质裂解酶或裂解素和穿孔素。穿孔素为疏水膜蛋白,该蛋白
表达对细胞裂解起较大作用。研究表明,构建含
肽。第一个被鉴定的分枝杆菌噬菌体裂解酶来自
的药物敏感性,分枝杆菌噬

裂解素基因与穿孔素基因有协同作用,且穿孔素基因的

在胞膜上形成孔或侵蚀斑,裂解素经该孔或侵蚀斑释放到
外周胞质,与肽葡聚糖底物接触,从而使细胞裂解,噬菌体释

聚糖生物合成中的酶均可作为抗病原菌的新型药物靶标。分

胞壁的代谢是合成与分解的平衡,细胞壁的生成需一系列的

微生物学报

离

和

与

为

为

### 参考文献
Molecular mechanism of the integration and lysis of mycobacteriophage

SHEN Yan-jie¹  HU Chang-hua¹  WANG Hong-hai²  XIE Jian-ping²,*

¹ Institute of Modern Biopharmaceuticals  School of Life Sciences  Southwest China University  Chongqing  400715  China
² State Key Laboratory of Genetic Engineering  School of Life Sciences  Institute of Genetics  Fudan University  Shanghai  200433  China

Abstract: Tuberculosis remains one of the major threats to public health. China is one of the heavy TB burden countries. Novel drugs and vaccines are urgently needed to combat the increasingly multidrug resistant TB. Mycobacteriophage is one of the hot topic in TB novel drugs discovery and drug susceptibility test. Phages can multiply via two alternative mechanisms: the lytic cycle or the lysogenic cycle. The lytic cycle ends with the lysis and death of the host cells whereas the host cell remains alive in the lysogenic cycle. Lysogenic mycobacteriophages were intensively studied to elucidate the integration and lysis mechanisms of mycobacteriophage. The integration of mycobacteriophage requires for attP of bacteriophage genome. attB of Mycobacterium genome integrase and integration host factor. Some lysogenic phage eg. mycobacteriophage Ms6 empley lytic cycle form new phage lysis host by the cooperation of lysis and holin and release phages. There is no reports as to the mycobacteriophage unique to China clinical or environmental isolates. Studies on the integration and lysis molecular mechanism of mycobacteriophage might facilitate future new anti-TB drugs development.

Key words: Mycobacteriophage  Integration  Lysis

Foundation item: National Natural Science Foundation of China 30270072  Science and Technology Key Program of Ministry of Education 105146.

* Corresponding author. Tel: 86-23-68254062 Fax: 86-23-68252365 E-mail: jianpingxie@vip. sina.com

Received date: 2005-12-25

---

《临床微生物学手册》(上下册)
〔美〕默里(N1BB&K,OI YI)等著 徐建国等译
2005年6月出版
定价: 680元

本书英文版由国际杰出的临床微生物学家编写,美国微生物学会出版,是临床微生物学领域的经典杰作。本书在第六版的基础上新增加了9个"鉴定法则"章,这些章内容涵盖病原体的基本知识(如镜下表现、基本生化反应结果)和确定性试验程序(表型试验、分子生物学诊断试验和免疫学试验)。中文版分上、下两册,共12卷,150章。为微生物学家、实验室人员、传染病专家、临床医师、医学院教师和学生提供了病原体分离、鉴定,传染病诊断,实验室安全等方面的详尽知识,包括全面开展有效实验室诊断所需的资料。在诊断和治疗的应用方面,指导临床微生物学家对试验步骤和程序进行选择、执行和解释。内容全面、新颖,可操作性强,并且通俗易懂,具有权威性。