

Bacillus sphaericus strain 2297: nucleotide sequence of 41.9 kDa toxin gene

John Hindley and Colin Berry¹

Institute of Molecular and Cell Biology, National University of Singapore, 10 Kent Ridge Crescent, Singapore 0511, Malaysia and ¹Department of Biochemistry, University of Bristol, University Walk, Bristol BS8 1TD, UK
Submitted February 29, 1988
Accession no. X07025

We previously reported the nucleotide and deduced amino acid sequences of *B. sphaericus* 1593 and 2362 41.9kDa larvicidal toxin genes (1 & 2). Both these strains belonged to the same H-flagellar antigen group (H 5a, 5b) and possessed identical coding sequences in an open reading frame of 1110 nucleotides. Using restriction fragment probes derived from these sequences we have identified and cloned in pUC12 a 3.5kb HindIII fragment from *B. sphaericus* 2297 which contains the entire toxin coding sequence. This strain belongs to a different antigenic group (H 25) and showed 15 nucleotide changes and a 2 nucleotide insertion when compared with the corresponding sequences from strains 1593 and 2362. Three of these occur upstream of the ORF as does the 2 nucleotide insertion (CT) at position 159-160 (ACTCTTTAA). Within the coding region 12 nucleotide changes were found of which 5 resulted in amino acid changes; V→F (99), A→S (104), H→N (125), Y→F (135), R→K (267). The total length of the toxin coding sequence was unchanged (370 amino acids). The putative SD sequence is boxed and the nucleotide changes are underlined.

```

ACCTATAACTAATCCACTTAGCTAACAAAACATACAATTATTCGATGTGAAAAATAGTTAGGATGGACACATATTTAAAAACCTTTAATCTTTAAAAATGGTGAAGTTATGTAAAAAC
120
GAATGAGAATAAATTAACCTAAAATTAACCAAGTGACTACTCTTTAAATTCAAAATATTCATTACCATGTTATTTAAAAATAGTAGATAGATGAATAAATAGTATAAATTAAGACAACAACITTA
240
ATTTTGACACATAAGAATAATTTTTAAATGTATAAATAGTATTTAGAGTGTATTGCAATATATTTTATGAAGGGAGCTTAAAGAATGAGAAATTTGGATTTTATGTATCTTTTATA
360
M R N L D F I D S F I
P T E G K Y I R V M D F Y N S E Y P F C I H A P S A P N G D I M T E I C S R E N
360
CCACAGAGAAGAAAGTACATTCGCGTATGGATTTTTATATAATGGCAGATATCCCTTCGTATACATGCACCCCTCAGCCCCCTAATGGGATATGTATGACAGAAATCTGTAGCAGAGAAAAT
480
NQYFIFFPPTDDDRVLIANRHNGSVFTGEATSVSVSDIYTG
480
AACCATATTTATTTTTCTTCTACTGATGATGGTGGATAATTTATGCCAATAGCCATATGGTCCGTTTTTACCGGAGAAGCTTACAGTGTAGTATCAGATATCTATACGTGAGC
600
P L O F F R E F K R T M S T Y Y L A I Q N P E S A T D V R A L E P N S H E L P S
600
CCATACAGTITTTTAGAGAGTTCAAAAGAACTATGCAACTTATTTATTTAGGAAATACAAAATCCTGAATCCGGCAACAGATGTGAGACTCTATGACAACCGAATCCCATGCTGCACTCT
720
R L Y P T N N I E N N S N I L I S N K E Q I Y L T L P S L P E N E Q Y P K T P V
720
CGCTCTATTTCACTAACAATATGAAAATAATAGCAACATATTAATTTCTAATAAGGAACAATATATTTAACTTCCCTCTCTCCAGAAAACGAGCAATACCCTAAAATCCAGTA
840
L S G I D D D I G P N Q S E K S I I G S T L I P C I M V S D P I S L G E R M K K T
840
TTAAGCGTATCGATGATATAGGAACCTAATCAGAGAAATCAATAATAGGAAGTACTCTTTATCCCATGTATAATGGTITGGGATTTTATAGTITGGGGGAGAGAAATGAAAACGACT
960
P Y Y Y V K H T Q Y W Q S M W S A L F P P G S K E T K T E K S G I T D T S Q I S
960
CCATATTTATGTAAAGCACACTCAATATTTGGCAAAGCATGTGGTCCGGCTCTTCCACCCCGCTCTAAAGAGACA AAAAATCGAGAAATCAGGATTTACTGACACTTCTCAAATAAGT
1080
M T D G I N V S I G A D F G L K F G N K T F G I K G G F T Y D T K T Q I T N T S
1080
ATGACTAGCAGGATTAATGTTCATATGGAGCAGATTTGGGATTAAGTTTGGAAATAAAAAGTTTGAATTAAGGGGGGGTTCACCTATGATACAAGACTCAAAATACCTAAATACCTCC
1200
Q L L I E T T Y T R E Y T N T E N F P V R Y T G Y V L A S E P T L H R S D G T Q
1200
CAATGTTAATAGAAACAACCTTACTAGCAAGATACAAAATACAGAAAATTTTCCCTGTAGATATACAGGCTATGTTTGGGTCAGAAATTTACTTTACATGTAGTGTATGGAAGTCAAG
1320
V N T I P W V A L N D N Y T T I A R Y P H P A S E P L L G N T K I I T D D Q N *
1320
GTATACAGATCCCATGGGTGCTTTAAAGCAACTATACAGATAGCAAGATATCCAGATTTTGGCAAGTGAACCTTTACTAGGAAATACAAGATTAACAGATGATCAAAAATCA
1440
ATTTAAACAATATTTCTGAACATAAGATGTAAATAGAACAAATTAATACAATTAAGTACTTTTGGATTATAGTGAAGGACCTATAAGCATAGCTTTTAGTCCCTTTTAGTGTCT
1560
TTTTTTCGTTTTAGAATAGTATAGATAGGCTACACTACACTAAGTGGACAG
    
```

REFERENCES. (1) Hindley, J. and Berry, C. (1987). *Mol. Microbiol.* 1: 187-194. (2) Berry, C. and Hindley, J. (1987). *Nucleic Acids Res.* 15: 5891.

Downloaded from <http://nar.oxfordjournals.org/> at Cardiff University on February 15, 2015