Nucleotide sequences of bacteriophage T4 genes 13, 14 and 15

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Gene products (gp) 13 and gp14 are the structural proteins of bacteriophage T4 that can be added to completed heads to activate them for tail joining in in vitro complementation mixtures (1,2). Gp13 and gp14 are also components of the necked tail, which can be disconnected from the mature phage (3). Gp15 stabilizes the tail sheath structure and produces the "connector" structure required for T4 head attachement (4). We report here the nucleotide sequences of genes 13-15. Open reading frame (ORF) of gene 13 is located after gene wac (5). ORFs of gene 13, 14 and 15 encode of the proteins with Mr 34,7; 29,5 and 31,4 kDa respectively that are very close to experimental data (6). Transcription of genes 13-15 is oriented under clockwise direction. Their common large messenger RNA contains genes 9, 10, 11, 12 and wac also. Behind of gene 15 the DNA sequence (underlined) exists which is able to form potential hairpin loop (- 21.9 kKal) that can terminate the transcription.

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                                Ter  end of gene wac                M  start of gene 13
   1 CTTTCTACCTTTTTATCACCAGCATAACATGGGGCCGCAAGGCCCCAAAGGATTTTAAATGTCAGGATATAATCCTCAGAATCCAAAGGAACTCAAAGATGTCATTCT
 109 AAGACGTTTAGGGGCTCCAATTATTAATGTTGAGTTAACACCCGATCAAATTTACGATTGTATCCAGCGTGCCCTAGAATTATACGGTGAATACCATTTTGATGGACT
 217 CAATAAAGGTTTTCATGTTTTTTATGTAGGGGATGATGAAGAAAGGTACAAGACCGGAGTCTTCGATTTAAGAGGTTCTAACGTATTTGCAGTAACCCGCATTTTACG
 325 CACAAATATTGGGTCAATAACATCTATGGATGGAAACGCTACATATCCGTGGTTTACTGACTTTCTTTTAGGAATGGCTGGTATTAATGGCGGAATGGGAACGTCTTG
 433 TAATAGATTTTATGGACCAAATGCCTTTGGAGCTGATTTAGGATATTTTACCCAGCTTACCAGTTATATGGGAATGATGCAAGATATGCTCTCTCCTATTCCAGACTT
 541 TTGGTTTAATTCAGCAAATGAACAGCTCAAAGTCATGGGAAACTTCCAAAAATATGATTTAATTATCGTAGAAAGCTGGACTAAATCATACATTGATACAAACAAAAT
 649 GGTTGGAAATACAGTAGGATATGGAACAGTCGGTCCACAAGATAGCTGGTCATTATCTGAACGATATAATAACCCAGACCACAATTTAGTAGGTCGTGTTGTCGGCCA
 757 AGATCCGAATGTTAAACAGGGTGCTTATAATAATCGTTGGGTGAAAGACTATGCAACAGCTTTAGCTAAAGAATTGAACGGTCAAATTTTAGCACGCCACCAAGGTAT
 865 GATGCTTCCGGGCGGTGTTACAATTGATGGGCAGCGCTTAATAGAAGAAGCCAGATTAGAAAAAGAAGCACTGCGCGAAGAATTATACTTACTTGATCCTCCATTTGG
                   Ter  M  start of gene 14
 973 AATTTTGGTAGGTTAATATGGCTACTTATGATAAAAATCTTTTTGCTAAATTGGAAAACCGCACAGGTTATTCTCAGACCAATGAAACTGAAATATTAAATCCTTATG
1081 TAAATTTCAATCATTATAAAAACAGCCAAATATTAGCTGATGTATTAGTAGCTGAAAGCATTCAAATGCGAGGTGTAGAATGCTATTATGTTCCAAGAGAGTATGTTT
1189 CCCCTGATTTGATATTCGGCGAAGACTTAAAAAATAAATTTACTAAAGCTTGGAAATTTGCTGCATATTTAAATTCATTTGAAGGATATGAAGGAGCTAAATCGTTCT
1297 TTAGTAACTTTGGTATGCAAGTACAAGACGAAGTGACTTTATCTATTAACCCAAATTTATTTAAGCATCAAGTTAACGGAAAAGAACCCAAGGAAGGTGATTTGATAT
1405 ATTTTCCTATGGATAACAGCTTATTTGAAATTAACTGGGTTGAACCATATGATCCATTTTATCAATTAGGCCAAAACGCTATTCGTAAAATTACGGCAGGTAAATTCA
1513 TTTATTCTGGAGAAGAAATTAATCCAGTTCTACAGAAAAATGAAGGAATTAACATTCCAGAATTTAGTGAATTAGAATTAAATGCTGTTCGCAATCTTAACGGTATTC
1621 ATGACATTAATATTGATCAGTATGCTGAAGTAGATCAAATTAATTCTGAAGCTAAAGAATACGTTGAACCTTATGTTGTTGTCAATAACAGAGGCAAATCTTTCGAAT
                                Ter                                                M  start of gene 15
1729 CTAGCCCATTTGACAATGATTTCATGGATTAATAAATATTATAAACTAATTAAAGCCCGGATTAGGAGAAGTCATGTTTGGTTATTTTTATAATTCGTCTTTTAGACG
1837 ATATGCTACCTTGATGGGCGATTTGTTTCAAATATCCAAATCAAACGTCAGTTAGAATCTGGTGATAAGTTTATACGTGTTCCTATTACGTATGCATCAAAGGAACA
1945 CTTTATGATGAAATTGAATAAATGGACATCAATAAATTCACAAGAAGATGTAGCTAAAGTTGAAACTATTCTACCTCGTATAAATTTACATTTAGTTGATTTTAGCTA
2053 TAATGCTCCATTTAAAACAAACATTTTAAATCAGAATTTACTGCAAAAAGGTGCAACTTCTGTAGTATCGCAGTATAATCCATCTCCTATTAAAATGATTTATGAATT
2161 GAGTATCTTTACTCGCTATGAAGATGATATGTTTCAAATAGTTGAACAGATTCTTCCATATTTTCAACCTCATTTTAATACAACTATGTACGAGCAGTTTGGAAATGA
2269 TATTCCATTTAAAAGGGATATTAAAATTGTACTGATGTCTGCTGCTATAGACGAAGCTATAGATGGGGATAATTTATCTCGTCGTAGAATTGAATGGTCATTAACATT
2377 TGAAGTAAATGGATGGATGTATCCTCCAGTAGATGATGCAGAAGGATTAATTCGTACTACTTATACAGATTTTCACGCCAATACAAGAGATTTGCCTGACGGCGAAGG
2485 TGTTTTTGAATCTGTCGATAGCGAAGTTGTTCCTCGAGGTATTGACCCAGAGGACTGGGATGGAACAGTAAAACAAACTTTCACTAGTAATGTAAATAGCCCAACACC
                                Ter end of gene 15
2593 GCCAGAACCTCCTGGCCCAAGAACATAGAGGTTATTATGGAAGGTCTTGATATAAACAAAACTTTTAGATATTTCTGACCTCCCCGGAATTGACGGGGAGGAAATCAA
2701 AAGTGTATGAACCTCTGCAATTA 2723
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