

U2 *nagAc* 319 GGCTCCAACGGGGAACCTCAAAGCGTTCCCTTTGAAAAAGATTGTACGGGATACGATCAAAAAGAAATGCTTGGGCTTGAAAGAAGTCCCCCGCCTC 418
 CJ2 *nagAc* 319 GGCTCCAACGGGGAACCTCAAAGCGTTCCCTTTGAAAAAGATTGTACGGGATACGATCAAAAAGAAATGCTTGGGCTTGAAAGAAGTCCCCCGCCTC 418
 GW *nagAc* 319 GGCTCCAACGGGGAACCTCAAAGCGTTCCCTTTGAAAAAGATTGTACGGGATACGATCAAAAAGAAATGCTTGGGCTTGAAAGAAGTCCCCCGCCTC 418
 U2 *nagAc* 419 GAAAGCTTTTCATGGCTTTCATTTACGGTGTGTTTTGATGCAGAGGCCCCCGCTTGTGATTATCTGGGTGATGCAGCCTGGTACTTGAACCCATCTTCA 518
 CJ2 *nagAc* 419 GAAAGCTTTTCATGGCTTTCATTTACGGTGTGTTTTGATGCAGAGGCCCCCGCTTGTGATTATCTGGGTGATGCAGCCTGGTACTTGAACCCATCTTCA 518
 GW *nagAc* 419 GAAAGCTTTTCATGGCTTTCATTTACGGTGTGTTTTGATGCAGAGGCCCCCGCTTGTGATTATCTGGGTGATGCAGCCTGGTACTTGAACCCATCTTCA 518
 U2 *nagAc* 519 AGCACTCTGGTGGCTCTGGAACCTGTAGGCCCCCCGGCAAAGTGGTGATCAAGGCCAACTGGAAGGCCCTCGGAAAACCTTTGTGGGTGACGCATACCA 618
 CJ2 *nagAc* 519 AGCACTCAGGCGGTCTGGAACCTGTAGGCCCCCCGGCAAAGTGGTGATCAAGGCCAACTGGAAGGCCCTCGGAAAACCTTTGTGGGTGACGCATACCA 618
 GW *nagAc* 519 AGCACTCAGGCGGTCTGGAACCTGTAGGCCCCCCGGCAAAGTGGTGATCAAGGCCAACTGGAAGGCCCTCGGAAAACCTTTGTGGGTGACGCATACCA 618
 U2 *nagAc* 619 CGTGGTGGTGGACGCACGCATCGTCTTTGCGCTCAGGTCAGTCGATATTTACCCCTCTGCGGGCAACGCATGCTTCCACCCGAAGGCGCGGGCTTCAA 718
 CJ2 *nagAc* 619 CGTGGTGGTGGACGCACGCATCGTCTTTGCGCTCAGGTCAGTCGATATTTACCCCTCTGCGGGCAACGCATGCTTCCACCCGAAGGCGCGGGCTTCAA 718
 GW *nagAc* 619 CGTGGTGGTGGACGCACGCATCGTCTTTGCGCTCAGGTCAGTCGATATTTACCCCTCTGCGGGCAACGCATGCTTCCACCCGAAGGCGCGGGCTTCAA 718
 U2 *nagAc* 719 ATGACCAGCAAATAGGCAGTGGAAATGGGGGTATTGTGGGACGGCTATCCGGGTGTCACAGTGGTACCTGGTCCCGAATGATGGCATTCCGGCGGG 818
 CJ2 *nagAc* 719 ATGACCAGCAAATAGGCAGTGGAAATGGGGGTATTGTGGGACGGCTATCCGGGTGTCACAGTGGTACCTGGTCCCGAATGATGGCATTCCGGCGGG 818
 GW *nagAc* 719 ATGACCAGCAAATAGGCAGTGGAAATGGGGGTATTGTGGGACGGCTATCCGGGTGTCACAGTGGTACCTGGTCCCGAATGATGGCATTCCGGCGGG 818
 U2 *nagAc* 819 CAAAACAGGAAAACTCGCCAAAGAAATCGGGGATGTCCGGGCACGGATTTACCGCAGCCATCTAACTGCACGGTTTTTCCCGAACAACAGCATTTTGAC 918
 CJ2 *nagAc* 819 CAAAACAGGAAAACTCGCCAAAGAAATCGGGGATGTCCGGGCACGGATTTACCGCAGCCATCTAACTGCACGGTTTTTCCCGAACAACAGCATTTTGAC 918
 GW *nagAc* 819 CAAAACAGGAAAACTCGCCAAAGAAATCGGGGATGTCCGGGCACGGATTTACCGCAGCCATCTAACTGCACGGTTTTTCCCGAACAACAGCATTTTGAC 918
 U2 *nagAc* 919 CTGCTCCGGTGTCTTCAAGGTCTGGAACCCGATCGATGAAACACGACCGAGTTTGGACGTATGCCATCGTGA AAAAAGACATGCCGAGGAACTTAAAG 1018
 CJ2 *nagAc* 919 CTGCTCCGGTGTCTTCAAGGTCTGGAACCCGATCGATGAAACACGACCGAGTTTGGACGTATGCCATCGTGA AAAAAGACATGCCGAGGAACTTAAAG 1018
 GW *nagAc* 919 CTGCTCCGGTGTCTTCAAGGTCTGGAACCCGATCGATGAAACACGACCGAGTTTGGACGTATGCCATCGTGA AAAAAGACATGCCGAGGAACTTAAAG 1018
 U2 *nagAc*1019 CGTTCGCTTGCTGACGCGGTTTCAGCGCACCTTCGGACCGCAGGATTCTGGGAAAGCGACGACAACGACAACATGGAGACGGAGTCGCAAAATGCCAAGA 1118
 CJ2 *nagAc*1019 ATCCGCTTAGCCGACGCGGTTTCAGCGCACCTTCGGACCGCAGGATTCTGGGAAAGCGACGACAACGACAACATGGAGACGGAGTCGCAAAATGCCAAGA 1118
 GW *nagAc*1019 ATCCGCTTAGCCGACGCGGTTTCAGCGCACCTTCGGACCGCAGGATTCTGGGAAAGCGACGACAACGACAACATGGAGACGGAGTCGCAAAATGCCAAGA 1118
 U2 *nagAc*1119 AATACCAATCCAGCAACAGGATCTGATTGCCAAATTTGGGTTTCGGCAAGGACGTCTACGGGAGGAAATGATCCGGGCGTCTGTCCAAATCGGCAT 1218
 CJ2 *nagAc*1119 AATACCAATCCAGCAACAGGATCTGATTGCCAAATTTGGGTTTCGGCAAGGACGTCTACGGGAGGAAATGATCCGGGCGTCTGTCCAAATCGGCAT 1218
 GW *nagAc*1119 AATACCAATCCAGCAACAGGATCTGATTGCCAAATTTGGGTTTCGGCAAGGACGTCTACGGGAGGAAATGATCCGGGCGTCTGTCCAAATCGGCAT 1218
 U2 *nagAc*1219 CGGGAAACCAGCTATCGCGGATTCTACCGTGCCTACCAAGCCACATCAGCAGCTCCAATTGGGCCGAGTTCGAAAACAGCTCCCGAATTTGGCAGACC 1318
 CJ2 *nagAc*1219 CGGGAAACCAGCTATCGCGGATTCTACCGTGCCTACCAAGCCACATCAGCAGCTCCAATTGGGCCGAGTTCGAAAACAGCTCCCGAATTTGGCAGACC 1318
 GW *nagAc*1219 CGGGAAACCAGCTATCGCGGATTCTACCGTGCCTACCAAGCCACATCAGCAGCTCCAATTGGGCCGAGTTCGAAAACAGCTCCCGAATTTGGCAGACC 1318
 U2 *nagAc*1319 GAACTCACCAAGACCACTGATCGCTAA 1345
 CJ2 *nagAc*1319 GAACTCACCAAGACCACTGATCGCTAA 1345
 GW *nagAc*1319 GAACTCACCAAGACCACTGATCGCTAA 1345

— GYVI30E01AX3SN
 - · - · GYVI30E01ERXW9
 = = = GYVI30E02FYFOH

U2	<i>nagAd</i>	1	ATGATGATCAATACCCAGGAAGACAAGCTGGTCTCCGCGCACGACGC	GAAGAATTTTCATCGTTTCTTCCTCGGACACGATAGCGATTGCAAGAAAG	100
CJ2	<i>nagAd</i>	1	ATGATGATCAATACCCAGGAAGACAAGCTGGTCTCCGCGCACGACGC	GAAGAATTTTCATCGTTTCTTCCTCGGACACGATAGCGATTGCAAGAAAG	100
GW	<i>nagAd</i>	1	<u>ATGATGATCAATACCCAGGAAGACAAGCTGGTCTCCGCGCACGACGC</u>	<u>GAAGAATTTTCATCGTTTCTTCCTCGGACACGATAGCGATTGCAAGAAAG</u>	100
U2	<i>nagAd</i>	101	TCATCACACTCCTGACCCGAGAAGCACATCTGTTGGACATTCAGGCATACAAGCCTGGCTTGAACACTGCGTTGCCCCCGAGATCAAATACCAAGTGAT	200	
CJ2	<i>nagAd</i>	101	TCATCACACTCCTGACCCGAGAAGCACATCTGTTGGACATTCAGGCATACAAGCCTGGCTTGAACACTGCGTTGCCCCCGAGATCAAATACCAAGTGAT	200	
GW	<i>nagAd</i>	101	<u>TCATCACACTCCTGACCCGAGAAGCACATCTGTTGGACATTCAGGCATACAAGCCTGGCTTGAACACTGCGTTGCCCCCGAGATCAAATACCAAGTGAT</u>	200	
U2	<i>nagAd</i>	201	CTCGGAGAAATTCGTTCCACTTCGAGCGTCGATACAAGCTGAATGATGCGGTGAACATCTACAACGAGAACTATCAGCAACTGAAAGTTCGAGTTGAG	300	
CJ2	<i>nagAd</i>	201	CTCGGAGAAATTCGTTCCACTTCGAGCGTCGATACAAGCTGAATGATGCGGTGAACATCTACAACGAGAACTATCAGCAACTGAAAGTTCGAGTTGAG	300	
GW	<i>nagAd</i>	201	<u>CTCGGAGAAATTCGTTCCACTTCGAGCGTCGATACAAGCTGAATGATGCGGTGAACATCTACAACGAGAACTATCAGCAACTGAAAGTTCGAGTTGAG</u>	300	
U2	<i>nagAd</i>	301	CATCAGATGACCCGCAGAAATGGGCCAACAGCCCGAAGATCGTTTTCACCCGTTTCGTCACCAATGTCAAGCCGCAAGGACAGATCGTACC GGATC	400	
CJ2	<i>nagAd</i>	301	CATCAGATGACCCGCAGAAATGGGCCAACAGCCCGAAGATCGTTTTCACCCGTTTCGTCACCAATGTCAAGCCGCAAGGACAGATCGTACC GGATC	400	
GW	<i>nagAd</i>	301	<u>CATCAGATGACCCGCAGAAATGGGCCAACAGCCCGAAGATCGTTTTCACCCGTTTCGTCACCAATGTCAAGCCGCAAGGACAGATCGTACC GGATC</u>	400	
U2	<i>nagAd</i>	401	TGCTGCATGTCCGTTCCAACCTCATTCTCCAC	432	
CJ2	<i>nagAd</i>	401	TGCTGCATGTCCGTTCCAACCTCATTCTCCAC	432	
GW	<i>nagAd</i>	401	<u>TGCTGCATGTCCGTTCCAACCTCATTCTCCAC</u>	432	

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U2	<i>nagB</i>	476	TTTCTTCCTATGCGGTCGGTGGCGGCGGTTCTTGCTACATGGCCAGCAAACATGCAGTGCTGGGATATGGTCAAGGCATTGGCCTACGAATTGGCTCCGCA	575
CJ2	<i>nagB</i>	476	TTTCTTCCTATGCGGTCGGTGGCGGCGGTTCTTGCTACATGGCCAGCAAACATGCAGTGCTGGGATATGGTCAAGGCATTGGCCTACGAATTGGCTCCGCA	575
GW	<i>nagB</i>	476	TTTCTTCCTATGCGGTCGGTGGCGGCGGTTCTTGCTACATGGCCAGCAAACATGCAGTGCTGGGATATGGTCAAGGCATTGGCCTACGAATTGGCTCCGCA	575
U2	<i>nagB</i>	576	CATCCGGGTCAATGGCGTTGCGCCAGGTGGTACGGTCACTTCTTTGGCTGGGCCGGCAAGCGCTGGTTTCGACAAAACAAAATGAAAGACATGCCCGGC	675
CJ2	<i>nagB</i>	576	CATCCGGGTCAATGGCGTTGCGCCAGGTGGTACGGTCACTTCTTTGGCTGGGCCGGCAAGCGCTGGTTTCGACAAAACAAAATGAAAGACATGCCCGGC	675
GW	<i>nagB</i>	576	CATCCGGGTCAATGGCGTTGCGCCAGGTGGTACGGTCACTTCTTTGGCTGGGCCGGCAAGCGCTGGTTTCGACAAAACAAAATGAAAGACATGCCCGGC	675
U2	<i>nagB</i>	676	ATCGATGACATGATCAAAGGCCTGACTCCCTTGGGGTTCGCGCAAGGCCCGAGGACGTGGTGGCACCGTACTTTTTGCTGGCCTCCCGGGAACAAGGGA	775
CJ2	<i>nagB</i>	676	ATCGATGACATGATCAAAGGCCTGACTCCCTTGGGGTTCGCGCAAGGCCCGAGGACGTGGTGGCACCGTACTTTTTGCTGGCCTCCCGGGAACAAGGGA	775
GW	<i>nagB</i>	676	ATCGATGACATGATCAAAGGCCTGACTCCCTTGGGGTTCGCGCAAGGCCCGAGGACGTGGTGGCACCGTACTTTTTGCTGGCCTCCCGGGAACAAGGGA	775
U2	<i>nagB</i>	776	AGTTCATCACTGGCACCGTATCAGCATTGATGGCGGCATGGCGCTCGGTCGAAAGTGA	834
CJ2	<i>nagB</i>	776	AGTTCATCACTGGCACCGTATCAGCATTGATGGCGGCATGGCGCTCGGTCGAAAGTGA	834
GW	<i>nagB</i>	776	AGTTCATCACTGGCACCGTATCAGCATTGATGGCGGCATGGCGCTCGGTCGAAAGTGA	834

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U2 *nagF* 1 ATGAAGACGAAATTGTTTATCAACACACCTGGAGCGCTTCGAGTGACAAAAAGTCAATTGATCGGAAGCACCCTGTCAGTGGCGAGGTCCTGACCCAAT 100
 CJ2 *nagF* 1 ATGAAGACGAAATTGTTTATCAACACACCTGGAGCGATTCAAGTGACAAAAAATCACTTGATCGGAAGCACCCTGTCAGTGGCGAGACCTGACCCAAT 100
 GW *nagF* 1 ATGAAGACGAAATTGTTTATCAACACACCTGGAGCGCTTCGAGTGACAAAAAGTCAATTGATCGGAAGCACCCTGTCAGTGGCGAGGTCCTGACCCAAT 100

 U2 *nagF* 101 GCGCGAAGGCACCGGTGGACGATGCGGGCAAGGCGGCTCAAGAGGCGTTCAGTTCCTGGAAGGCCGTGGACCCTCGGAGCGGGGGCGCCT 200
 CJ2 *nagF* 101 GCGCGAAGGCACCGGTGGACGATGCGGGCAAGGCGGCTCAAGAGGCGTTCAGTTCCTGGAAGGCCGTGGACCCTCGGAGCGGGGGCGCCT 200
 GW *nagF* 101 GCGCGAAGGCACCGGTGGACGATGCGGGCAAGGCGGCTCAAGAGGCGTTCAGTTCCTGGAAGGCCGTGGACCCTCGGAGCGGGGGCGCCT 200

 U2 *nagF* 201 TCTTTTGAAGGTGGCAGAGTTCATGGAGAGCAAACGCCCGAGTTCATCAAGTGATGGCCAAGGAAGTGGGGCCCTCCGCGCTTGGGCGGGGTTC AAC 300
 CJ2 *nagF* 201 TCTTTTGAAGGTGGCAGAGTTCATGGAGAGCAAACGCCCGAGTTCATCAAGTGATGGCCAAGGAAGTGGGGCCCTCCGCGCTTGGGCGGGGTTC AAC 300
 GW *nagF* 201 TCTTTTGAAGGTGGCAGAGTTCATGGAGAGCAAACGCCCGAGTTCATCAAGTGATGGCCAAGGAAGTGGGGCCCTCCGCGCTTGGGCGGGGTTC AAC 300

 U2 *nagF* 301 GTGCACCTGTCGGCCAATGTATTCCGGGAAGCCGCCTCACTGGCCACCAAATCAAGGTGAAACCATTCCGACGGACAAGCTGACACCCTGTCATGA 400
 CJ2 *nagF* 301 GTGCACCTGTCGGCCAATGTATTCCGGGAAGCCGCCTCACTGGCCACCAAATCAAGGTGAAACCATTCCGACGGACAAGCTGACACCCTGTCATGA 400
 GW *nagF* 301 GTGCACCTGTCGGCCAATGTATTCCGGGAAGCCGCCTCACTGGCCACCAAATCAAGGTGAAACCATTCCGACGGACAAGCTGACACCCTGTCATGA 400

 U2 *nagF* 401 CGCTGCGTCAACCGTGTCCGGCCCCATCTTGAGTATCGTTCCCTGGAACGGCACCGCCGTTGCTCGCGGCGCGGGCCATCGCTTATCCGTGGTCTGCGGCAA 500
 CJ2 *nagF* 401 CGCTGCGTCAACCGTGTCCGGCCCCATCTTGAGTATCGTTCCCTGGAACGGCACCGCCGTTGCTCGCGGCGCGGGCCATCGCTTATCCGTGGTCTGCGGCAA 500
 GW *nagF* 401 CGCTGCGTCAACCGTGTCCGGCCCCATCTTGAGTATCGTTCCCTGGAACGGCACCGCCGTTGCTCGCGGCGCGGGCCATCGCTTATCCGTGGTCTGCGGCAA 500

 U2 *nagF* 501 TACCGTGTGTTCAAAGGCTCCGAGTTCAGCCCCGGACGCACGCGTTGATCGCGAAGTGCCTACAGGAGGCCGCTGCCCTGCTGGCGTGTCAAATAT 600
 CJ2 *nagF* 501 TACCGTGTGTTCAAAGGCTCCGAGTTCAGCCCCGGACGCACGCGTTGATCGCGAAGTGCCTACAGGAGGCCGCTGCCCTGCTGGCGTGTCAAATAT 600
 GW *nagF* 501 TACCGTGTGTTCAAAGGCTCCGAGTTCAGCCCCGGACGCACGCGTTGATCGCGAAGTGCCTACAGGAGGCCGCTGCCCTGCTGGCGTGTCAAATAT 600

 U2 *nagF* 601 TCTGAACTCTCCCCGGACCGTCGCCCGATATGCGGATGCGCTGATTTTCGTCTAAAGAGATTTCGTCGCATCAACTTACAGGGCTCCACTCGCGTGGGGC 700
 CJ2 *nagF* 601 TCTGAACTCTCCCCGGACCGTCGCCCGATATGCGGATGCGCTGATTTTCGTCTAAAGAGATTTCGTCGCATCAACTTACAGGGCTCCACTCGCGTGGGGC 700
 GW *nagF* 601 TCTGAACTCTCCCCGGACCGTCGCCCGATATGCGGATGCGCTGATTTTCGTCTAAAGAGATTTCGTCGCATCAACTTACAGGGCTCCACTCGCGTGGGGC 700

 U2 *nagF* 701 GCATCATCGCCCAGAAAACCGGCCAACATCTCAAGCGCTGCTTGCTGGAGTTGGGTGGCAAGTCCCCGCTGATCGTTCTGGACGACGCGGACATCGACGC 800
 CJ2 *nagF* 701 GCATCATCGCCCAGAAAACCGGCCAACATCTCAAGCGCTGCTTGCTGGAGTTGGGTGGCAAGTCCCCGCTGATCGTTCTGGACGACGCGGACATCGACGC 800
 GW *nagF* 701 GCATCATCGCCCAGAAAACCGGCCAACATCTCAAGCGCTGCTTGCTGGAGTTGGGTGGCAAGTCCCCGCTGATCGTTCTGGACGACGCGGACATCGACGC 800

 U2 *nagF* 801 GCGGCGTCAAGGCACGGGTGTTGGCAGTTTCCCTGTTCCAAGGCCAGATCTGCATGTCCACCGAACGCCTGGTGGTGCACGAAAGATCGCGGACGAATTT 900
 CJ2 *nagF* 801 GCGGCGTCAAGGCACGGGTGTTGGCAGTTTCCCTGTTCCAAGGCCAGATCTGCATGTCCACCGAACGCCTGGTGGTGCACGAAAGATCGCGGACGAATTT 900
 GW *nagF* 801 GCGGCGTCAAGGCACGGGTGTTGGCAGTTTCCCTGTTCCAAGGCCAGATCTGCATGTCCACCGAACGCCTGGTGGTGCACGAAAGATCGCGGACGAATTT 900

 U2 *nagF* 901 GTCGCGAAGTTCGTCGAGAAAACCAAGAGTTGAGTGCAGGCGATCCATGCGTACAGGGGACTGCAATCATGGCCCGATGGTGTGCGCCAACCTCGGGT 1000
 CJ2 *nagF* 901 GTCGCGAAGTTCGTCGAGAAAACCAAGAGTTGAGTGCAGGCGATCCATGCGTACAGGGGACTGCAATCATGGCCCGATGGTGTGCGCCAACCTCGGGT 1000
 GW *nagF* 901 GTCGCGAAGTTCGTCGAGAAAACCAAGAGTTGAGTGCAGGCGATCCATGCGTACAGGGGACTGCAATCATGGCCCGATGGTGTGCGCCAACCTCGGGT 1000

 U2 *nagF* 1001 ACCGATCAATGGCTGTGTTCAAAGATGCCATCAGCAAGGGTGCCAAGGTTCGTGTGCGGGGGATGGCCGAGGGTGCGGTTCATGCCCGCCACGATCTGGA 1100
 CJ2 *nagF* 1001 ACCGATCAATGGCTGTGTTCAAAGATGCCATCAGCAAGGGTGCCAAGGTTCGTGTGCGGGGGATGGCCGAGGGTGCGGTTCATGCCCGCCACGATCTGGA 1100
 GW *nagF* 1001 ACCGATCAATGGCTGTGTTCAAAGATGCCATCAGCAAGGGTGCCAAGGTTCGTGTGCGGGGGATGGCCGAGGGTGCGGTTCATGCCCGCCACGATCTGGA 1100

 U2 *nagF* 1101 CCACGTGACAGCCGACATGCAGATCTACGATGAGGAAACCTTCGGTCCCATCACCTGTGGTTATCCGGTGAAGAGCGAAGCGGACGCCATCCGATTGCC 1200
 CJ2 *nagF* 1101 CCACGTGACAGCCGACATGCAGATCTACGATGAGGAAACCTTCGGTCCCATCACCTGTGGTTATCCGGTGAAGAGCGAAGCGGACGCCATCCGATTGCC 1200
 GW *nagF* 1101 CCACGTGACAGCCGACATGCAGATCTACGATGAGGAAACCTTCGGTCCCATCACCTGTGGTTATCCGGTGAAGAGCGAAGCGGACGCCATCCGATTGCC 1200

 U2 *nagF* 1201 AATGACAGCGCTATCGGCCTGTCATCGGGCGTGTGTTGGCCGGGACGTCAACCGGGCTGTCGCGTGGGATGGCGATCGAATACGGCTCGGTCCATATCA 1300
 CJ2 *nagF* 1201 AATGACAGCGCTATCGGCCTGTCATCGGGCGTGTGTTGGCCGGGACGTCAACCGGGCTGTCGCGTGGGATGGCGATCGAATACGGCTCGGTCCATATCA 1300
 GW *nagF* 1201 AATGACAGCGCTATCGGCCTGTCATCGGGCGTGTGTTGGCCGGGACGTCAACCGGGCTGTCGCGTGGGATGGCGATCGAATACGGCTCGGTCCATATCA 1300

 U2 *nagF* 1301 ACGGCTCACCGTTCAGAACGAGGCTCAGGCGCCTTATGGCGGACAAAGGCCACCGGTTATGGCGCTTCGACGGACGCGCGGTGATGACGAGTTCAC 1400
 CJ2 *nagF* 1301 ACGGCTCACCGTTCAGAACGAGGCTCAGGCGCCTTATGGCGGACAAAGGCCACCGGTTATGGCGCTTCGACGGACGCGCGGTGATGACGAGTTCAC 1400
 GW *nagF* 1301 ACGGCTCACCGTTCAGAACGAGGCTCAGGCGCCTTATGGCGGACAAAGGCCACCGGTTATGGCGCTTCGACGGACGCGCGGTGATGACGAGTTCAC 1400

 U2 *nagF* 1401 GGAACTCAAAGTGGCTGACCATTGAACCTTCGAGCAGCAGTATCCCTTCTAA 1452
 CJ2 *nagF* 1401 GGAACTCAAATGGCTGACCATTGAACCTTCGAGCAGCAGTATCCCTTCTAA 1452
 GW *nagF* 1401 GGAACTCAAATGGCTGACCATTGAACCTTCGAGCAGCAGTATCCCTTCTAA 1452

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 - · - · - GYVI30E01ALPVF

U2 *nagC* 1 ATGATCAAGCGGCAACAGTGTATTGAATTTGGGTACATGGGCATTTTCGGTCAAGGATCCCGCAGCGTGGAAATCCTTTGCCGCAACATGCTGGGACTTC. 100
 CJ2 *nagC* 1 ATGATCAAGCGGCAACAGTGTATTGAATTTGGGTACATGGGCATTTTCGGTCAAGGATCCCGCAGCGTGGAAATCCTTTGCCGCAACATGCTGGGACTTC. 100
 GW *nagC* 1 ATGATCAAGCGGCAACAGTGTATTGAATTTGGGTACATGGGCATTTTCGGTCAAGGATCCCGCAGCGTGGAAATCCTTTGCCGCAACATGCTGGGACTTC. 100

 U2 *nagC* 101 AAGTCCTCGATGAGGGTGACAAGGATCGCTTCTATCTGCGAATGGACAATTGGCACCAATCGGATCGTGGTTCATCACAAGGGTCAAGATGACCTTGAATA 200
 CJ2 *nagC* 101 AAGTCCTCGATGAGGGTGACAAGGATCGCTTCTATCTGCGAATGGACAATTGGCACCAATCGGATCGTGGTTCATCACAAGGGTCAAGATGACCTTGAATA 200
 GW *nagC* 101 AAGTCCTCGATGAGGGTGACAAGGATCGCTTCTATCTGCGAATGGACAATTGGCACCAATCGGATCGTGGTTCATCACAAGGGTCAAGATGACCTTGAATA 200

 U2 *nagC* 201 CTTGGGCTGGCGTGTTCGCGGGTCAACCGGAATTCGATGCATTGGGTCAAAAGCTCTGGACGCAGGCTACAAAGTCCCGTGTGCGACAAGCCGAAGCA 300
 CJ2 *nagC* 201 CTTGGGCTGGCGTGTTCGCGGGTCAACCGGAATTCGATGCATTGGGTCAAAAGCTCTGGACGCAGGCTACAAAGTCCCGTGTGCGACAAGCCGAAGCA 300
 GW *nagC* 201 CTTGGGCTGGCGTGTTCGCGGGTCAACCGGAATTCGATGCATTGGGTCAAAAGCTCTGGACGCAGGCTACAAAGTCCCGTGTGCGACAAGCCGAAGCA 300

 U2 *nagC* 301 CAAAGAACCGATGGTGTCTGGGCCTGATGAAGACGAAGATCCGGGTGGCAACCCGACCGAGATTTTCTGGGGACCCTGGATGACCTGAACAACCCCTTCC 400
 CJ2 *nagC* 301 CAAAGAACCGATGGTGTCTGGGCCTGATGAAGACGAAGATCCGGGTGGCAACCCGACCGAGATTTTCTGGGGACCCTGGATGACCTGAACAACCCCTTCC 400
 GW *nagC* 301 CAAAGAACCGATGGTGTCTGGGCCTGATGAAGACGAAGATCCGGGTGGCAACCCGACCGAGATTTTCTGGGGACCCTGGATGACCTGAACAACCCCTTCC 400

 U2 *nagC* 401 ATCCCGGTCTCCCTTGCACGGGAAATTTCTAACGGGTGATCAGGGCCTGGGCCACTGCATCGTGCCTCAGAACGATGTGAAGCGGCACGTAAGTTCTA 500
 CJ2 *nagC* 401 ATCCCGGTCTCCCTTGCACGGGAAATTTCTAACGGGTGATCAGGGCCTGGGCCACTGCATCGTGCCTCAGAACGATGTGAAGCGGCACGTAAGTTCTA 500
 GW *nagC* 401 ATCCCGGTCTCCCTTGCACGGGAAATTTCTAACGGGTGATCAGGGCCTGGGCCACTGCATCGTGCCTCAGAACGATGTGAAGCGGCACGTAAGTTCTA 500

 U2 *nagC* 501 TAGCTTGCTGGGATTTTCGTGGAGATGTCGAGTACCGCCTTCCCTTGCCCAACGGCATGACGGCTGAGTTGACCTTCATGCATTGCAATGCTCGCGATCA 600
 CJ2 *nagC* 501 TAGCTTGCTGGGATTTTCGTGGAGATGTCGAGTACCGCCTTCCCTTGCCCAACGGCATGACGGCTGAGTTGACCTTCATGCATTGCAATGCTCGCGATCA 600
 GW *nagC* 501 TAGCTTGCTGGGATTTTCGTGGAGATGTCGAGTACCGCCTTCCCTTGCCCAACGGCATGACGGCTGAGTTGACCTTCATGCATTGCAATGCTCGCGATCA 600

 U2 *nagC* 601 TCCATCGCTTTCGGTTCGAATGCCTGCGGCCAAGCGCCTCAATCATCTGATGATTGAATACACCCATCTGGAAGATTTGGGTTTACACACCAGCTTTTCA 700
 CJ2 *nagC* 601 TCCATCGCTTTCGGTTCGAATGCCTGCGGCCAAGCGCCTCAATCATCTGATGATTGAATACACCCATCTGGAAGATTTGGGTTTACACACCAGCTTTTCA 700
 GW *nagC* 601 TCCATCGCTTTCGGTTCGAATGCCTGCGGCCAAGCGCCTCAATCATCTGATGATTGAATACACCCATCTGGAAGATTTGGGTTTACACACCAGCTTTTCA 700

 U2 *nagC* 701 CGAAGGAAAGATTGACATGCTTTGCAATTTGGGATTCATGCCAACGAAAGGGCGCTGACGTTCTAGGGGCAACACCTTCCGGCTGGCTGATCGAACC 800
 CJ2 *nagC* 701 CGAAGGAAAGATTGACATGCTTTGCAATTTGGGATTCATGCCAACGAAAGGGCGCTGACGTTCTAGGGGCAACACCTTCCGGCTGGCTGATCGAACC 800
 GW *nagC* 701 CGAAGGAAAGATTGACATGCTTTGCAATTTGGGATTCATGCCAACGAAAGGGCGCTGACGTTCTAGGGGCAACACCTTCCGGCTGGCTGATCGAACC 800

 U2 *nagC* 801 TGGGTGGCGAGGGCCCTCCCGCCATTTGCTGAATCGGAATATTACGTGCGGCGACATTTTCGGCCATCCATCGAGGCCACCGGTTATGGATTGGACGTCAA 900
 CJ2 *nagC* 801 TGGGTGGCGAGGGCCCTCCCGCCATTTGCTGAATCGGAATATTACGTGCGGCGACATTTTCGGCCATCCATCGAGGCCACCGGTTATGGATTGGACGTCAA 900
 GW *nagC* 801 TGGGTGGCGAGGGCCCTCCCGCCATTTGCTGAATCGGAATATTACGTGCGGCGACATTTTCGGCCATCCATCGAGGCCACCGGTTATGGATTGGACGTCAA 900

 U2 *nagC* 901 CTGAGCTAG 909
 CJ2 *nagC* 901 CTGAGCTAA 909
 GW *nagC* 901 CTGAGCTAA 909

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 - - - - - GYVI30E01CD7IX

U2 *nagQ* 1 ATGATCAAAAAGCCATTTCCCTCGCAGGACTTGGGATGCTGATGCTCAGCACCGCATATGCCGAGGATTCCCCTGGTCTATCGCATCGGGGCCACCA 100
 CJ2 *nagQ* 1 ATGATCAAAAAGCCATTTCCCTCGCAGGACTTGGGATGCTGATGCTCAGCACCGCATATGCCGAGGATTCCCCTGGTCTATCGCATCGGGGCCACCA 100
 GW *nagQ* 1 ATGATCAAAAAGCCATTTCCCTCGCAGGACTTGGGATGCTGATGCTCAGCACCGCATATGCCGAGGATTCCCCTGGTCTATCGCATCGGGGCCACCA 100

 U2 *nagQ* 101 ACGTAGCCTTCGATGCGAGCGCCAAAGTTCGATTGACGGAAACAGGTGTGCCGGGTGGAGCGCTGACGCCAGTGACACAACGCTTTGACATTTGACTT 200
 CJ2 *nagQ* 101 ACGTAGCCTTCGATGCGAGCGCCAAAGTTCGATTGACGGAAACAGGTGTGCCGGGTGGAGCGCTGACGCCAGTGACACAACGCTTTGACATTTGACTT 200
 GW *nagQ* 101 ACGTAGCCTTCGATGCGAGCGCCAAAGTTCGATTGACGGAAACAGGTGTGCCGGGTGGAGCGCTGACGCCAGTGACACAACGCTTTGACATTTGACTT 200

 U2 *nagQ* 201 CGGTACATCATTAACGATAACTGGAACGCGCGATTAAATGTTGGCATTCCAACCACAAAAGTGACGGGGCGAGGACGCTGCCCTCCGATTTTGGCTG 300
 CJ2 *nagQ* 201 CGGTACATCATTAACGATAACTGGAACGCGCGATTAAATGTTGGCATTCCAACCACAAAAGTGACGGGGCGAGGACGCTGCCCTCCGATTTTGGCTG 300
 GW *nagQ* 201 CGGTACATCATTAACGATAACTGGAACGCGCGATTAAATGTTGGCATTCCAACCACAAAAGTGACGGGGCGAGGACGCTGCCCTCCGATTTTGGCTG 300

 U2 *nagQ* 301 GGCCGTGTC CAATAAGCTCCCTGCA GTTTTGTGCGGCGACCTACAACCTGCCACAGATGGGATTGGTTGCGCCCTACGTGGGGGCGGGGATCAACTACACTC 400
 CJ2 *nagQ* 301 GGCCGTGTC CAATAAGCTCCCTGCA GTTTTGTGCGGCGACCTACAACCTGCCACAGATGGGATTGGTTGCGCCCTACGTGGGGGCGGGGATCAACTACACTC 400
 GW *nagQ* 301 GGCCGTGTC CAATAAGCTCCCTGCA GTTTTGTGCGGCGACCTACAACCTGCCACAGATGGGATTGGTTGCGCCCTACGTGGGGGCGGGGATCAACTACACTC 400

 U2 *nagQ* 401 GAATTTGAAAAGCGAAGATGCCAATCTGACCTCATTTCGATGCAGATCATGCGTGGGCACCTGTGCTCCACATCGGTCGAGAAGCGAACATCAACCGCGA 500
 CJ2 *nagQ* 401 GAATTTGAAAAGCGAAGATGCCAATCTGACCTCATTTCGATGCAGATCATGCGTGGGCACCTGTGCTCCACATCGGTCGAGAAGCGAACATCAACCGCGA 500
 GW *nagQ* 401 GAATTTGAAAAGCGAAGATGCCAATCTGACCTCATTTCGATGCAGATCATGCGTGGGCACCTGTGCTCCACATCGGTCGAGAAGCGAACATCAACCGCGA 500

 U2 *nagQ* 501 CTGGTTGTCAGCTTTGATATCCGAAAACTTTATCTAAAAACAGATGCATCGGGTTTCTTGGGCCCAAGTTCGACAGCCCGGTAACATTGAATCCG 600
 CJ2 *nagQ* 501 CTGGTTGTCAGCTTTGATATCCGAAAACTTTATCTAAAAACAGATGCATCGGGTTTCTTGGGCCCAAGTTCGACAGCCCGGTAACATTGAATCCG 600
 GW *nagQ* 501 CTGGTTGTCAGCTTTGATATCCGAAAACTTTATCTAAAAACAGATGCATCGGGTTTCTTGGGCCCAAGTTCGACAGCCCGGTAACATTGAATCCG 600

 U2 *nagQ* 601 CTGCTGACCTCGATTGCGATTGGCCGGAGATTCTGA 636
 CJ2 *nagQ* 601 CTGCTGACCTCGATTGCGATTGGCCGGAGATTCTGA 636
 GW *nagQ* 601 CTGCTGACCTCGATTGCGATTGGCCGGAGATTCTGA 636

U2	<i>nagE</i>	1	ATGACAAGAAAGACGAGCAAAGCGGTGCGCCTGACCGCGGGGATATTCAAGGCGCATGGGTCAITCATGCCGACCCCGTCCACGCCGGATGCCTCGGACT	100
CJ2	<i>nagE</i>	1	ATGACAAGAAAGACGAGCAAAGCGACGCGCCTGACTGCAGAGGATATTCAAGGCGCATGGGTCAITCATGCCGACCCCGTCCACGCCGGATGCCTCGGACT	100
GW	<i>nagE</i>	1	ATGACAAGAAAGACGAGCAAAGCGACGCGCCTGACTGCAGAGGATATTCAAGGCGCATGGGTCAITCATGCCGACCCCGTCCACGCCGGATGCCTCGGACT	100
U2	<i>nagE</i>	101	GGCGCAGCACGCACACGGTGGATCTCGACGAGACGGCCCGGATGTCTGAGGAGTTGATAGCGGCCGGGTCAATGGCATTCTGAGCCACGGCACCTTTTGG	200
CJ2	<i>nagE</i>	101	GGCGCAGCACGCACACGGTGGATCTCGACGAGACGGCCCGGATGTCTGAGGAGTTGATAGCGGCCGGGTCAATGGCATTCTGAGCCACGGCACCTTTTGG	200
GW	<i>nagE</i>	101	GGCGCAGCACGCACACGGTGGATCTCGACGAGACGGCCCGGATGTCTGAGGAGTTGATAGCGGCCGGGTCAATGGCATTCTGAGCCACGGCACCTTTTGG	200
U2	<i>nagE</i>	201	CGAATGCGCGACGCTGACGTGGGAGGAGAAGCGGGATTTTTGTTTTCAACGGTTCGTGGAAACCGCGCGGTTCGAGTGCCTACTTCTGCGGCACAACGGCC	300
CJ2	<i>nagE</i>	201	TGAATGCGCGACGCTGACGTGGGAGGAGAAGCGGGATTTTTGTTTTCAACGGTTCGTGGAAACCGCGCGGTTCGAGTGCCTACTTCTGCGGCACAACAGCC	300
GW	<i>nagE</i>	201	TGAATGCGCGACGCTGACGTGGGAGGAGAAGCGGGATTTTTGTTTTCAACGGTTCGTGGAAACCGCGCGGTTCGAGTGCCTACTTCTGCGGCACAACAGCC	300
U2	<i>nagE</i>	301	TTGAATACCCGTGAAGTCATACGCCAGACCCGCGAATGTATCGACATTGGCGCCCAAGGAACATGCTCGGCGTGCCGATGTGGGTGAAGATGGATCTGC	400
CJ2	<i>nagE</i>	301	TTGAATACCCGTGAAGTCATACGCCAGACCCGCGAATGTATCGACATTGGCGCCCAAGGAACATGCTCGGCGTGCCGATGTGGGTGAAGATGGATCTGC	400
GW	<i>nagE</i>	301	TTGAATACCCGTGAAGTCATACGCCAGACCCGCGAATGTATCGACATTGGCGCCCAAGGAACATGCTCGGCGTGCCGATGTGGGTGAAGATGGATCTGC	400
U2	<i>nagE</i>	401	CTACTGCCGTGCAATTTTTATCGCGATGTGGCGGAAGCGGTGCCAGATGCGGCCATCGCTGTCTACGCCAACCCGGAGGCTTTCAAATTTGATTTTCCTCG	500
CJ2	<i>nagE</i>	401	CTACTGCCGTGCAATTTTTATCGCGATGTGGCGGAAGCGGTGCCAGATGCGGCCATCGCTGTCTACGCCAACCCGGAGGCTTTCAAATTTGATTTTCCTCG	500
GW	<i>nagE</i>	401	CTACTGCCGTGCAATTTTTATCGCGATGTGGCGGAAGCGGTGCCAGATGCGGCCATCGCTGTCTACGCCAACCCGGAGGCTTTCAAATTTGATTTTCCTCG	500
U2	<i>nagE</i>	501	CCCGTTTTGGGCCGAAATGTCCAAAATCCCGCAAGTTGTACAGCCAAGTACTTGGGCATCGGATGCTGGACTTGGATCTGAAATGGCCCAAATATT	600
CJ2	<i>nagE</i>	501	CCCGTTTTGGGCCGAAATGTCCAAAATCCCGCAAGTTGTACAGCCAAGTACTTGGGCATCGGATGCTGGACTTGGATCTGAAATGGCCCAAATATT	600
GW	<i>nagE</i>	501	CCCGTTTTGGGCCGAAATGTCCAAAATCCCGCAAGTTGTACAGCCAAGTACTTGGGCATCGGATGCTGGACTTGGATCTGAAATGGCCCAAATATT	600
U2	<i>nagE</i>	601	CGCTTCCTTCCGCATGAGGATGACTACTACGCTGCGGCCCGGATCAATCCGAGCGCATGACTGCTTTCTGGTCTAGCGGTTCATGTGCGGCCAGCGA	700
CJ2	<i>nagE</i>	601	CGCTTCCTTCCGCATGAGGATGACTACTACGCTGCGGCCCGGATCAATCCGAGCGCATGACTGCTTTCTGGTCTAGCGGTTCATGTGCGGCCAGCGA	700
GW	<i>nagE</i>	601	CGCTTCCTTCCGCATGAGGATGACTACTACGCTGCGGCCCGGATCAATCCGAGCGCATGACTGCTTTCTGGTCTAGCGGTTCATGTGCGGCCAGCGA	700
U2	<i>nagE</i>	701	CGGCCCTTGTGCTCCGGATGAGGTGGTAAAGGCCAAATAACAGGTGATTTGGCCCAAGGCCAAGGCATTTTCAGATGACATGCGCGCAGCCGATGCCAC	800
CJ2	<i>nagE</i>	701	CGGCCCTTGTGCTCCGGATGAGGTGGTAAAGGCCAAATAACAGGTGATTTGGCCCAAGGCCAAGGCATTTTCAGATGACATGCGCGCAGCCGATGCCAC	800
GW	<i>nagE</i>	701	CGGCCCTTGTGCTCCGGATGAGGTGGTAAAGGCCAAATAACAGGTGATTTGGCCCAAGGCCAAGGCATTTTCAGATGACATGCGCGCAGCCGATGCCAC	800
U2	<i>nagE</i>	801	ACTGTTTTCCACGCGGCATTTCTCGGAATTCTCAAATAACAACATTGGCTCGAAAAAGCACGAATGGACGAGGCAGGCTGGCTCAAAGCGGGGGCCGTGC	900
CJ2	<i>nagE</i>	801	ACTGTTTTCCACGCGGCATTTCTCGGAATTCTCAAATAACAACATTGGCTCGAAAAAGCACGAATGGACGAGGCAGGCTGGCTCAAAGCGGGGGCCGTGC	900
GW	<i>nagE</i>	801	ACTGTTTTCCACGCGGCATTTCTCGGAATTCTCAAATAACAACATTGGCTCGAAAAAGCACGAATGGACGAGGCAGGCTGGCTCAAAGCGGGGGCCGTGC	900
U2	<i>nagE</i>	901	CGGCCACCCTATACGCTGGTCCCGAGGAATACCTTGCAGGTGCCGAAAATCAGGCAAGGCCTGGGCCGCACTGCATACCAAGTATGCCAAGGAATTGA	1000
CJ2	<i>nagE</i>	901	CGGCCACCCTATACGCTGGTCCCGAGGAATACCTTGCAGGTGCCGAAAATCAGGCAAGGCCTGGGCCGCACTGCATACCAAGTATGCCAAGGAATTGA	1000
GW	<i>nagE</i>	901	CGGCCACCCTATACGCTGGTCCCGAGGAATACCTTGCAGGTGCCGAAAATCAGGCAAGGCCTGGGCCGCACTGCATACCAAGTATGCCAAGGAATTGA	1000
U2	<i>nagE</i>	1001	GGAAAACCAAACCGGCAACCAACTCGAAAAAGAAGTAA	1038
CJ2	<i>nagE</i>	1001	GGAAAACCAAACCGGCAACCAACTCGAAAAAGAAGTAA	1038
GW	<i>nagE</i>	1001	GGAAAACCAAACCGGCAACCAACTCGAAAAAGAAGTAA	1038

— GYVI30E01EB2RY
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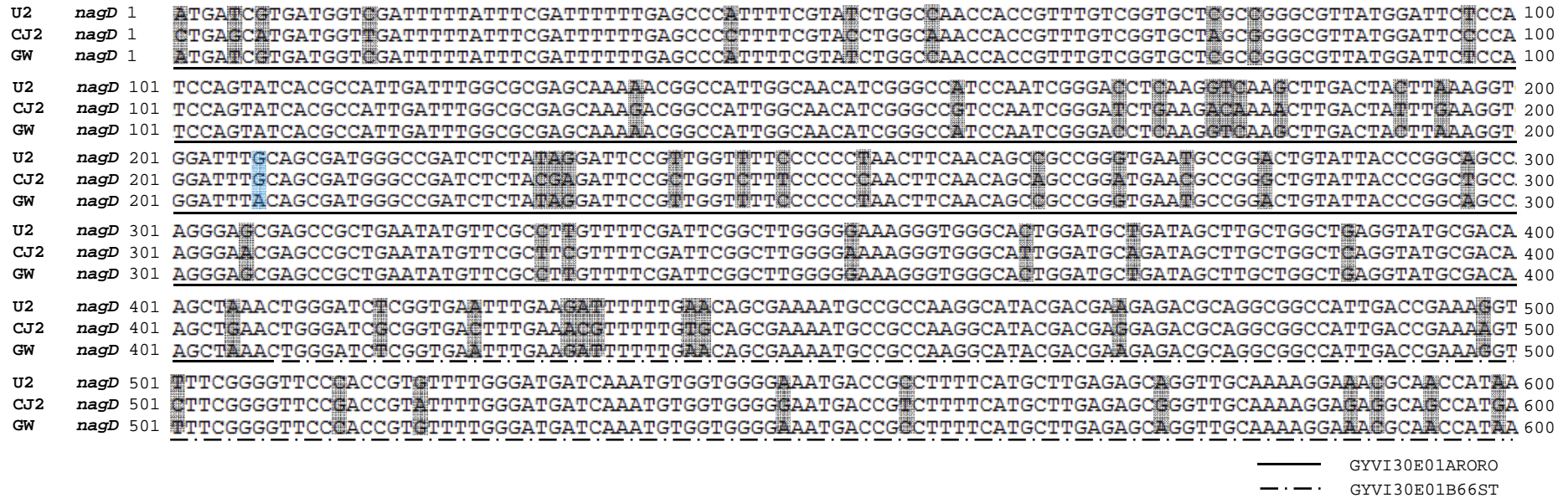


Figure S6. Multi-sequence alignment of the *nag* operons, including *nag2*, *nag-U2* and *nag-CJ2*.

Bases which were not the same between *nag2*, *nag-U2* and *nag-CJ2* are colored.

Grey highlight represents homologous bases between *nag2* and *nag-U2*, but different from *nag-CJ2*;

Red highlight represents homologous bases between *nag2* and *nag-CJ2*, but different from *nag-U2*;

Blue highlight represents bases of *nag2* with no homologies with either *nag-CJ2* or *nag-U2*.

The DNA sequence of *nagFCQED* is from the plasmid pWH_NagFCQED. Bases from single 454 sequencing read are underlined and marked alongside each gene. The numbers on the bottom right are the codes of individual 454 sequence reads.