

Supplementary materials for

The Synthesis of NMN by Cascade Catalysis of Intracellular Multiple Enzymes

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This PDF files include:

Figures S1 to S3

Table S1

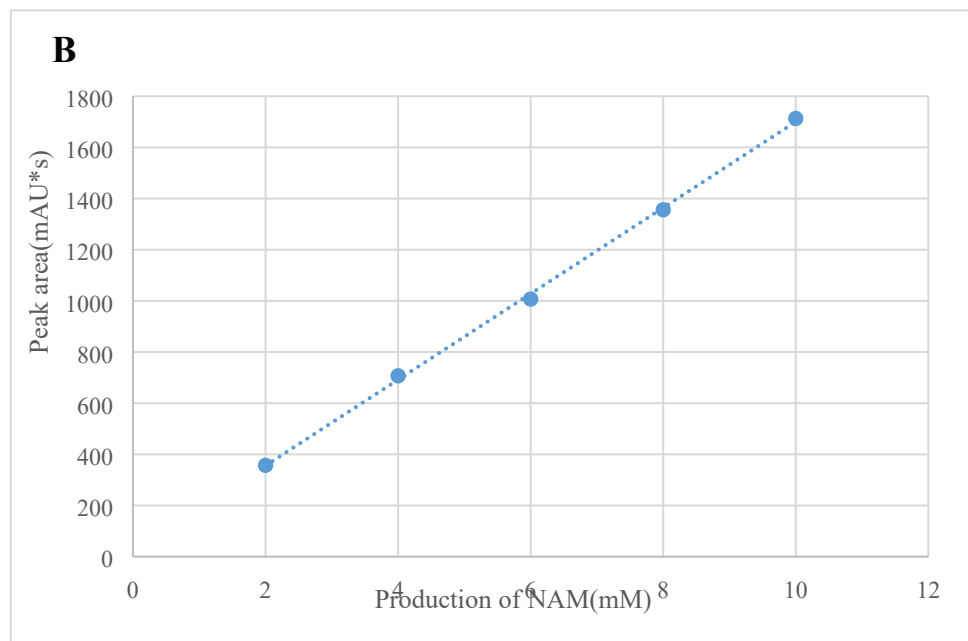
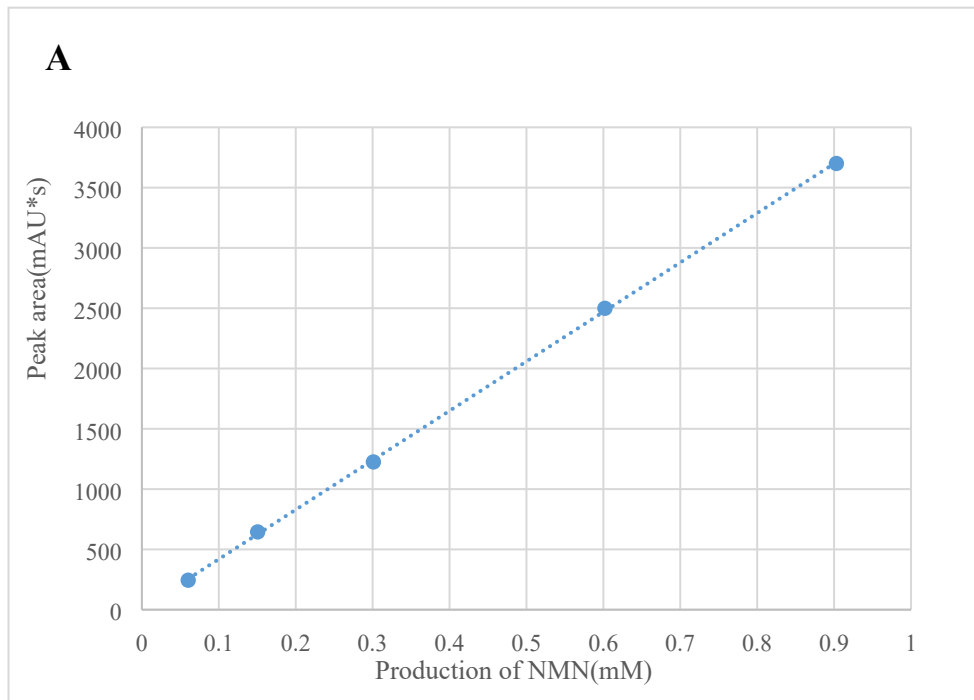


Figure S1. The standard curve of substrates and products HPLC

A. The standard curve of NMN HPLC ; B. The standard curve of NAM HPLC

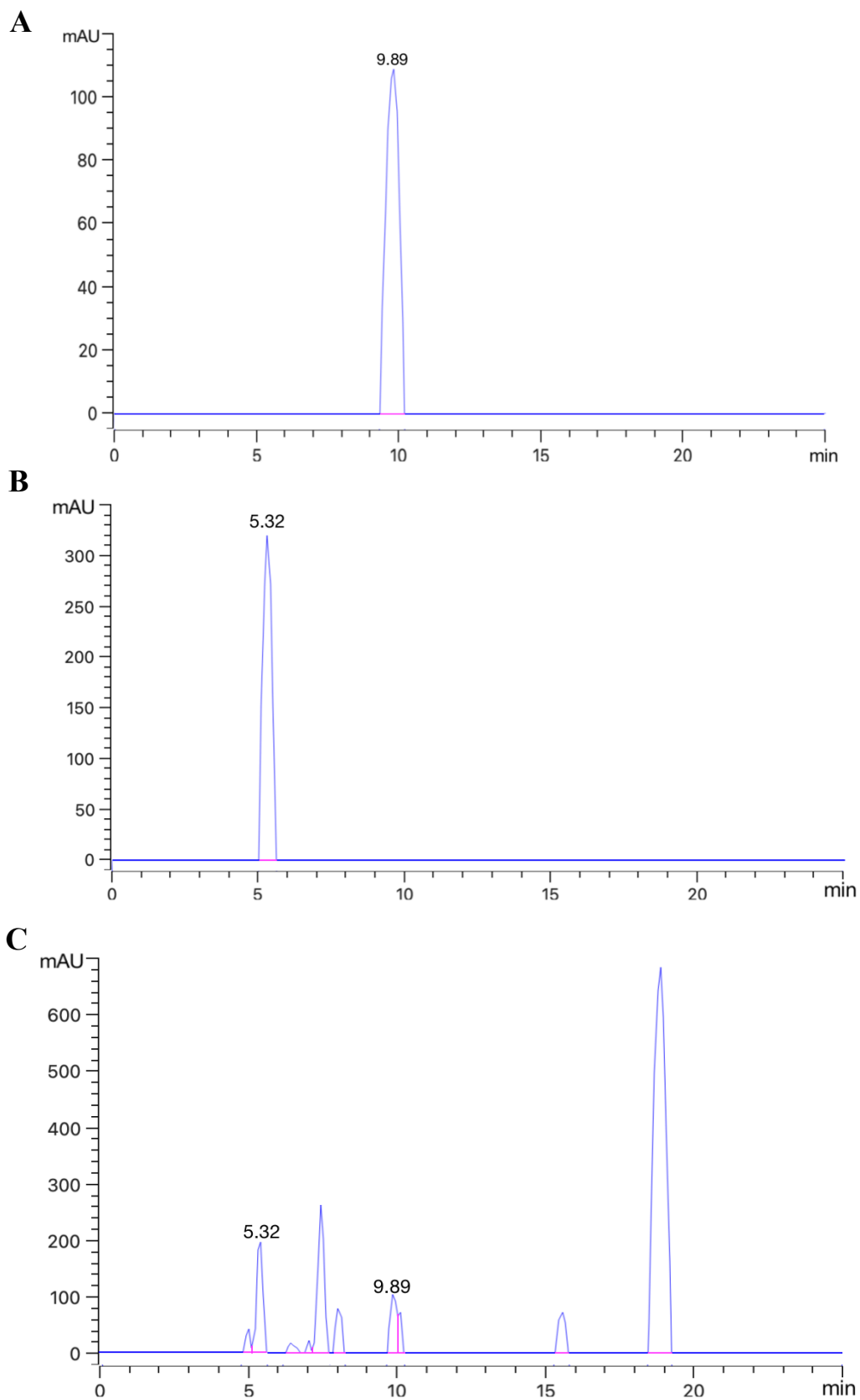


Figure S2. Schematic diagram of HPLC results

A. HPLC results of 8mM NAM standard sample; B. HPLC results of 0.7mM NMN standard sample; C. HPLC results of NMN production through GP pathway

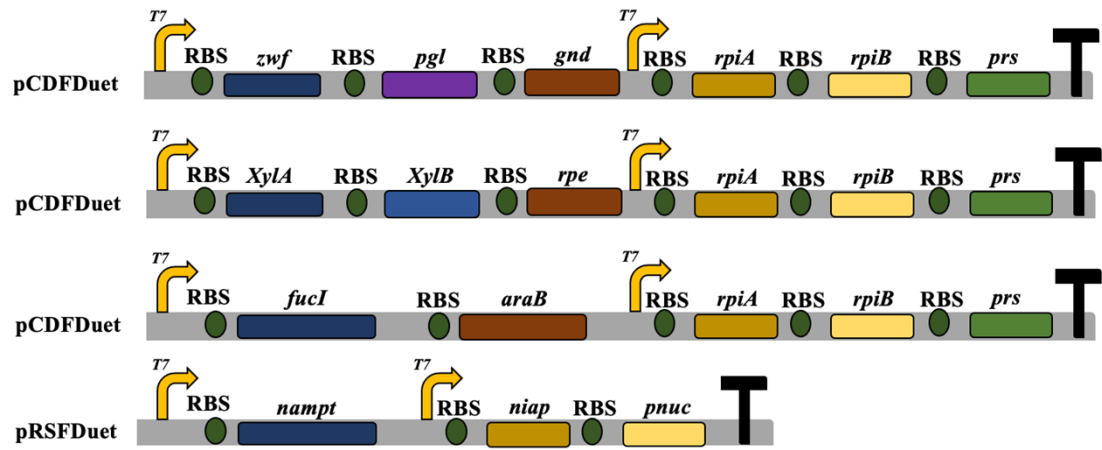


Figure S3. Schematic diagram of plasmid construction

Supplementary Table S1. The gene sequences used in this study

Genes	Sequences (5'-3')
Zwf	<p>ATGGCGGTAACGCAAACAGCCCAGGCCTGTGACCTGGTCATTTTCGGCGCG AAAGGCGACCTTGCGCGTCGTAAATTGCTGCCTTCCCTGTATCAACTGGAAA AAGCCGCTCAGCTCAACCCGGACACCCGGATTATCGGCGTAGGGCGTGCTG ACTGGGATAAAGCGGCATATACCAAAGTTGTCCGCGAGGCGCTCGAACTT TCATGAAAGAAACCATTGATGAAGGTTTATGGGACACCCTGAGTGCACGTCT GGATTTTTGTAATCTCGATGTCAATGACACTGCTGCATTCAGCCGTCTCGGC GCGATGCTGGATCAAAAAAATCGTATCACCATTA ACTACTTTGCCATGCCGC CCAGCACTTTTGGCGCAATTTGCAAAGGGCTTGGCGAGGCAAACTGAATG CTAAACCGGCACGCGTAGTCATGGAGAAACCCTGGGGACGTCGCTGGCGA CCTCGCAGGAAATCAATGATCAGGTTGGCGAATACTTCGAGGAGTGCCAGG TTTACCGTATCGACCACTATCTTGGTAAAGAAACGGTGCTGAACCTGTTGGC GCTGCGTTTTGCTAACTCCCTGTTTGTGAATAACTGGGACAATCGCACCATT GATCATGTTGAGATTACCGTGGCAGAAGAAGTGGGGATCGAAGGGCGCTGG GGCTATTTTGATAAAGCCGGTCAGATGCGCGACATGATCCAGAACCACCTGC TGCAAATCTTTGCATGATTGCGATGTCTCCGCCGTCTGACCTGAGCGCAGA CAGCATCCGCGATGAAAAAGTGAAAGTACTGAAGTCTCTGCGCCGCATCGA CCGCTCCAACGTACGCGAAAAAACCGTACGCGGGCAATATACTGCGGGCTT CGCCCAGGGCAAAAAAGTGCCGGGATATCTGGAAGAAGAGGGCGCGAACA AGAGCAGCAATACAGAACTTTCGTGGCGATCCGCGTCGACATTGATAACT GGCGCTGGGCCGGTGTGCCATTCTACCTGCGTACTGGTAAACGTCTGCCGAC CAAATGTTCTGAAGTCGTGGTCTATTTCAAACACCTGAACTGAATCTGTTT AAAGAATCGTGGCAGGATCTGCCGCAGAATAAACTGACTATCCGTCTGCAA CCTGATGAAGGCGTGGATATCCAGGTA CTGAATAAAGTTCCTGGCCTTGACC ACAAACATAACCTGCAAATCACCAAGCTGGATCTGAGCTATTCAGAAACCTT TAATCAGACGCATCTGGCGGATGCCTATGAACGTTTGCTGCTGGAAACCATG CGTGGTATTCAGGCACTGTTTGTACGTGCGGACGAAGTGGAGAAGCCTGG AAATGGGTAGACTCCATTACTGAGGCGTGGGCGATGGACAATGATGCGCCG AAACCGTATCAGGCCGGAACCTGGGGACCCGTTGCCTCGGTGGCGATGATT ACCCGTGATGGTCGTTCCCTGGAATGAGTTTGAGTAA</p>
Pgl	<p>ATGAAGCAAACAGTTTATATCGCCAGCCCTGAGAGCCAGCAAATTCACGTCT GGAATCTGAATCATGAAGGCGCACTGACGCTGACACAGGTTGTCGATGTGC CGGGGCAGGTGCAGCCGATGGTGGTCAGCCCGGACAAACGTTATCTCTATG TTGGTGTTCGCCCTGAGTTTCGCGTCCTGGCGTATCGTATCGCCCCGGACGA TGCGCACTGACCTTTGCCGCAGAGTCTGCGCTGCCGGGTAGTCCGACGCAT ATTTCCACCGATCACCAGGGCAGTTTGTCTTTGTAGGTTCTTACAATGCGG GTAACGTGAGCGTAAACGCGTCTGGAAGATGGCCTGCCAGTGGGCGTCGTCG ATGTGGTTCGAGGGGCTGGACGTTGCCATTCCGCCAATATCTCACC GGACAA CCGTACGCTGTGGGTTCCGGCATTAAAGCAGGATCGCATTTGCCTGTTTACG GTCAGCGATGATGGTCATCTCGTGGCGCAGGACCCTGCGGAAGTGACCACC GTTGAAGGGGCCCGCCCGT CATATGGTATTCCATCCAAACGAACAATAT GCGTATTGCGTCAATGAGTTAAACAGCTCAGTGGATGTCTGGGAACTGAAA</p>

	<p>GATCCGCACGGTAATATCGAATGTGTCCAGACGCTGGATATGATGCCGGAA AACTTCTCCGACACCCGTTGGGCGGCTGATATTCATATCACCCCGGATGGTC GCCATTTATACGCCTGCGACCGTACCGCCAGCCTGATTACCGTTTTACGCGT TTCGGAAGATGGCAGCGTGTGAGTAAAGAAGGCTTCCAGCCAACGGAAAC CCAGCCGCGCGGCTTCAATGTTGATCACAGCGGCAAGTATCTGATTGCCGCC GGGCAAAAATCTCACCACATCTCGGTATACGAAATTGTTGGCGAGCAGGGG CTACTGCATGAAAAAGGCCGCTATGCGGTTCGGGCAGGGACCAATGTGGGTG GTGGTTAACGCACACTAA</p>
Gnd	<p>ATGTCCAAGCAACAGATCGGCGTAGTCGGTATGGCAGTGATGGGACGCAAC CTTGCGCTCAACATCGAAAGCCGTGGTTATACCGTCTCTATTTTCAACCGTTC CCGTGAGAAGACGGAAGAAGTGATTGCCGAAAATCCAGGCAAGAACTGGT TCCTTACTATACGGTGAAAGAGTTTGTGCAATCTCTGGAAACGCCTCGTCGC ATCCTGTTAATGGTGAAAGCAGGTGCAGGCACGGATGCTGCTATTGATTCCC TCAAACCATATCTCGATAAAGGAGACATCATCATTGATGGTGGTAACACCTT CTTCCAGGACACTATTCGTCGTAATCGTGAGCTTTCAGCAGAGGGCTTTAAC TTCATCGGTACCGGTGTTTCTGGCGGTGAAGAGGGGGCGCTGAAAGGTCCTT CTATTATGCCTGGTGGCCAGAAAGAAGCCTATGAATTGGTAGCACCGATCCT GACCAAAATCGCCGCCGTAGCTGAAGACGGTGAACCATGCGTTACCTATATT GGTGCCGATGGCGCAGGTCACTATGTGAAGATGGTTCACAACGGTATTGAA TACGGCGATATGCAGCTGATTGCTGAAGCCTATTCTCTGCTTAAAGGTGGCC TGAACCTACCAACGAAGAAGTGGCGCAGACCTTTACCGAGTGGAATAACG GTGAACTGAGCAGTTACCTGATCGACATCACCAAAGATATCTTCACCAAAA AAGATGAAGACGGTAACTACCTGGTTGATGTGATCCTGGATGAAGCGGCTA ACAAAGGTACCGGTAAATGGACCAGCCAGAGCGCGCTGGATCTCGGCGAAC CGCTGTGCTGATTACCGAGTCTGTGTTTGCACGTTATATCTTCTCTGAAA GATCAGCGTGTGCCGCATCTAAAGTTCTCTCTGGTCCGCAAGCACAGCCAG CAGGCGACAAGGCTGAGTTCATCGAAAAAGTTCGTCGTGCGCTGTATCTGG GCAAAAATCGTTTCTTACGCCAGGGCTTCTCTCAGCTGCGTGCTGCGTCTGA AGAGTACAACCTGGGATCTGAACTACGGCGAAATCGCGAAGATTTTCCGTGC TGGCTGCATCATCCGTGCGCAGTTCCTGCAGAAAATCACCGATGCTTATGCC GAAAATCCACAGATCGCTAACCTGTTGCTGGCTCCGTACTTCAAGCAAATTG CCGATGACTACCAGCAGGCGCTGCGTGATGTCGTTGCTTATGCAGTACAGAA CGGTATTCCGGTTCGGACCTTCTCCGCAGCGGTTGCCTATTACGACAGCTAC CGTGCTGCTGTTCTGCCTGCGAACCTGATCCAGGCACAGCGTACTATTTTG GTGCGCATACTTATAAGCGTATTGATAAAGAAGGTGTGTTCCATAACCGAATG GCTGGATTAA</p>
RpiA	<p>ATGACGCAGGATGAATTGAAAAAAGCAGTAGGATGGGCGGCACCTTCAGTAT GTTACGCCCGGCACCATTGTTGGTGTAGGTACAGGTTCCACCGCCGCACACT TTATTGACGCGCTCGGTACAATGAAAGGCCAGATTGAAGGGGCGGTTTCCA GTTACAGATGCTTCCACTGAAAAACTGAAAAGCCTCGGCATTCACGTTTTTGA TCTCAACGAAGTCGACAGCCTTGGCATCTACGTTGATGGCGCAGATGAAATC AACGGCCACATGCAAATGATCAAAGGCGGCGGCGGCGCTGACCCGTGAA AAAATCATTGCTTCGGTTGCAGAAAAATTTATCTGTATTGCAGACGCTTCCA AGCAGGTTGATATTCTGGGTAAATTCCCGCTGCCAGTAGAAGTTATCCCGAT</p>

	GGCACGTAGTGCAGTGGCGCGTCAGCTGGTGAAACTGGGCGGTTCGTCCGGA ATACCGTCAGGGCGTGGTGACCGATAATGGCAACGTGATCCTCGACGTCCA CGGCATGAAAATCCTTGACCCGATAGCGATGGAAAACGCCATAAATGCGAT TCCTGGCGTGGTGACTGTTGGCTTGTGGCTAACCCTGGCGCGGACGTTGCG CTGATTGGCACACCTGACGGTGTCAAACCATTGTGAAATGA
RpiB	ATGAAAAAGATTGCATTTGGCTGTGATCATGTCCGGTTTCATTTTAAAACATG AAATAGTGGCACATTTAGTTGAGCGTGGCGTTGAAGTGATTGATAAAGGAA CCTGGTCGTCAGAGCGTACTGATTATCCACATTACGCCAGTCAAGTCGCACT GGCTGTTGCTGGCGGAGAGGTTGATGGCGGGATTTTGATTTGTGGTACTGGC GTCGGTATTTTCGATAGCGGCGAACAAGTTTGGCCGGAATTCGCGCGGTTCGTCT GTAGCGAACCTTATTCCGCGCAACTTTCGCGGCAGCATAACGACACCAACGT GCTGGCTTTTGGTTCACGAGTGGTTGGCCTCGAACTGGCAAAAATGATTGTG GATGCGTGGCTGGGCGCACAGTACGAAGGCGGTTCGTCATCAACAACGCGTG GAGGCGATTACGGCAATAGAGCAGCGGAGAAATTGA
Prs	GTGCCTGATATGAAGCTTTTTGCTGGTAACGCCACCCCGGAACTAGCACAAC GTATTGCCAACCGCCTGTACACTTACTCGGCGACCCGCTGTAGGTCGCTT TAGCGATGGCGAAGTCAGCGTACAAATTAATGAAAATGTACGCGGTGGTGA TATTTTCATCATCCAGTCCACTTGTGCCCTACTAACGACAACCTGATGGAA TTAGTCGTTATGGTTGATGCCCTGCGTCGTGCTTCCGCAGGTCGATACCCGC TGTTATCCCCTACTTTGGCTATGCGCGCCAGGACCGTCGCGTCCGTTCCGCTC GTGTACCAATCACTGCGAAAGTGGTTGCAGACTTCCCTCTCCAGCGTCGGTGT TGACCGTGTGCTGACAGTGGATCTGCACGCTGAACAGATTCAGGGTTTCTTC GACGTTCCGGTTGATAACGTATTTGGTAGCCCGATCCTGCTGGAAGACATGC TGCAGCTGAATCTGGATAACCCAATTGTGGTTTCTCCGGACATCGGCGGCGT TGTGCGTGCCCGCGCTATCGCTAAGCTGCTGAACGATACCGATATGGCAATC ATCGACAAACGTTCGTCGCGTGCGAACGTTTCACAGGTGATGCATATCATCG GTGACGTTGCAGGTCGTGACTGCGTACTGGTCGATGATATGATCGACACTGG CGGTACGCTGTGTAAAGCTGCTGAAGCTCTGAAAGAACGTGGTGCTAAACG TGTATTTGCGTACGCGACTACCCGATCTTCTCTGGCAACGCGGCGAACAAC CTGCGTAACTCTGTAATTGATGAAGTCGTTGTCTGCGATACCATTCCGCTGA GCGATGAAATCAAATCACTGCCGAACGTGCGTACTCTGACCCTGTCAGGTAT GCTGGCCGAAGCGATTCGTCGATCAGCAACGAAGAATCGATCTCTGCCATG TTCGAACACTAA
XylA	ATGCAAGCCTATTTTGACCAGCTCGATCGCGTTCGTTATGAAGGCTCAAAT CCTCAAACCCGTTAGCATTCCGTCACTACAATCCCGACGAACTGGTGTGGG TAAGCGTATGGAAGAGCACTTGCGTTTTGCCGCCTGCTACTGGCACACCTC TGCTGGAACGGGGCGGATATGTTTGGTGTGGGGGCGTTAATCGTCCGTGGC AGCAGCCTGGTGAGGCACTGGCGTTGGCGAAGCGTAAAGCAGATGTCGCAT TTGAGTTTTTCCACAAGTTACATGTGCCATTTTATTGCTTCCACGATGTGGAT GTTTCCCCTGAGGGCGCGTCGTTAAAAGAGTACATCAATAATTTTGCGAAA TGGTTGATGTCTGGCAGGCAAGCAAGAAGAGAGCGGCGTGAAGCTGCTGT GGGGAACGGCCAACTGCTTTACAAACCCTCGCTACGGCGCGGGTGC GGCGA CGAACCCAGATCCTGAAGTCTTACGCTGGGCGGCAACGCAAGTTGTTACAG CGATGGAAGCAACCCATAAATTGGGCGGTGAAAACCTATGTCCTGTGGGGCG

	<p>GTCGTGAAGGTTACGAAACGCTGTTAAATACCGACTTGCGTCAGGAGCGTG AACAACTGGGCCGCTTTATGCAGATGGTGGTTGAGCATAAACATAAAATCG GTTTCCAGGGCACGTTGCTTATCGAACCGAAACCGCAAGAACCGACCAAAC ATCAATATGATTACGATGCCGCGACGGTCTATGGCTTCCTGAAACAGTTTGG TCTGGAAAAAGAGATTAACTGAACATTGAAGCTAACCACGCGACGCTGGC AGGTCACTCTTCCATCATGAAATAGCCACCGCCATTGCGCTTGGCCTGTT GGTTCTGTCGACGCCAACCGTGGCGATGCGCAACTGGGCTGGGACACCGAC CAGTTCCCGAACAGTGTGGAAGAGAATGCGCTGGTGTATGAAATTCTC AAAGCAGGCGGTTTACCACCGGTGGTCTGAACTTCGATGCCAAAGTACGTC GTCAAAGTACTGATAAATATGATCTGTTTTACGGTCATATCGGCGCGATGGA TACGATGGCACTGGCGCTGAAAATTGCAGCGCGCATGATTGAAGATGGCGA GCTGGATAAACGCATCGCGCAGCGTTATTCCGGCTGGAATAGCGAATTGGG CCAGCAAATCCTGAAAGGCCAAATGTCACTGGCAGATTTAGCCAAATATGC TCAGGAACATCATTGTCTCCGGTGCATCAGAGTGGTCGCCAGGAACAACG GAAAATCTGGTAAACCATTATCTGTTTCGACAAATAA</p>
XylB	<p>ATGTATATCGGGATAGATCTTGGCACCTCGGGCGTAAAAGTTATTTTGCTCA ACGAGCAGGGTGAGGTGGTTGCTGCGCAAACGGAAAAGCTGACCGTTTCGC GCCCCGATCCACTCTGGTCGGAACAAGACCCGGAACAGTGGTGGCAGGCAA CTGATCGCGCAATGAAAGCTCTGGGCGATCAGCATTCTCTGCAGGACGTTAA AGCATTGGGTATTGCCGGCCAGATGCACGGAGCAACCTTGCTGGATGCTCA GCAACGGGTGTTACGCCCTGCCATTTTGTGGAACGACGGGCGCTGTGCGCAA GAGTGCACCTTTGCTGGAAGCGCGAGTTCCGCAATCGCGGGTGATTACCGGC AACCTGATGATGCCCGGATTTACTGCGCCTAAATTGCTATGGGTTACGCGGC ATGAGCCGGAGATATCCGTCAAATCGACAAAGTATTATTACCGAAAGATT ACTTGCGTCTGCGTATGACGGGGGAGTTTGCCAGCGATATGTCTGACGCAGC TGGCACCATGTGGCTGGATGTGCGAAAGCGTGACTGGAGTGACGTCATGCT GCAGGCTTGCGACTTATCTCGTGACCAGATGCCCCGATTATACGAAGGCAGC GAAATTACTGGTGCTTTGTTACCTGAAGTTGCGAAAGCGTGGGGTATGGCGA CGGTGCCAGTTGTCGCAGGCGGTGGCGACAATGCAGCTGGTGCAGTTGGTG TGGGAATGGTTGATGCTAATCAGGCAATGTTATCGCTGGGGACGTCGGGGG TCTATTTTGTGTCAGCGAAGGGTTCTTAAGCAAGCCAGAAAGCGCCGTACA TAGCTTTTGCCATGCGCTACCGCAACGTTGGCATTTAATGTCTGTGATGCTG AGTGCAGCGTCGTGTCTGGATTGGGCCGCGAAATTAACCGGCCTGAGCAAT GTCCCAGCTTTAATCGCTGCAGCTCAACAGGCTGATGAAAGTGCCGAGCCA GTTTGGTTTCTGCCTTATCTTTCCGGCGAGCGTACGCCACACAATAATCCCCA GGCGAAGGGGGTTTTCTTTGGTTTACTCATCAACATGGCCCCAATGAACTG GCGCGAGCAGTGTGGAAGGCGTGGGTTATGCGCTGGCAGATGGCATGGAT GTCGTGCATGCCCTGCGGTATTAACCGCAAAGTGTTACGTTGATTGGGGGCG GGGCGCGTAGTGAGTACTGGCGTCAGATGCTGGCGGATATCAGCGGTCAGC AGCTCGATTACCGTACGGGGGGGATGTGGGGCCAGCACTGGGCGCAGCAA GGCTGGCGCAGATCGCGGCGAATCCAGAGAAATCGCTCATTGAATTGTTGC CGCAACTACCGTTAGAACAGTCGCATCTACCAGATGCGCAGCGTTATGCCGC TTATCAGCCACGACGAGAAACGTTCCGTCGCTCTATCAGCAACTTCTGCCA TTAATGGCGTAA</p>

Rpe	<p>ATGAAACAGTATTTGATTGCCCCCTCAATTCTGTGCGGCTGATTTTGCCCCGCT GGGTGAAGATACCGCAAAGCCCTGGCAGCTGGCGCTGATGTGCTGCATTTT GACGTCATGGATAACCACTATGTTCCCAATCTGACGATTGGGCCAATGGTGC TGAAATCCTTGCGTAACTATGGCATTACCGCCCCTATCGACGTACACCTGAT GGTGAAACCCGTCGATCGCATTGTGCCTGATTTGCTGCGGCTGGTGCCAGC ATCATTACCTTTCATCCAGAAGCCTCCGAGCATGTTGACCGCACGCTGCAAC TGATTAAGAAAATGGCTGTAAAGCGGGTCTGGTATTTAACCCGGCGACAC CTCTGAGCTATCTGGATTACGTGATGGATAAGCTGGATGTGATCCTGCTGAT GTCCGTCAACCCTGGTTTCGGCGGTGAGTCTTTCATTCCTCAAACACTGGAT AACTGCGCGAAGTACGTCGCCGTATCGACGAGTCTGGCTTTGACATTCGAC TAGAAGTGGACGGTGGCGTGAAGGTGAACAACATTGGCGAAATCGCTGCGG CGGGCGCGGATATGTTTCGTGCGCGGTTTCGGCAATCTTCGACCAGCCAGACTA CAAAAAAGTCATTGATGAAATGCGCAGTGAACCTGGCAAAGGTAAGTCATGA ATAA</p>
Fucl	<p>ATGAAAAAATCAGCTTACCGAAAATTGGTATCCGCCCCGTTATTGACGGTC GTCGCATGGGTGTTTCGTGAGTCGCTTGAAGAACAACAATGAATATGGCGA AAGCTACGGCCGCACTGCTGACCGAGAACTGCGCCATGCCTGCGGAGCTG CCGTCGAGTGTGTCATTTCCGATACCTGTATCGCGGGTATGGCTGAAGCCGC TGCTTGCGAAGAAAAATTCAGCAGTCAGAATGTAGGCCTCACCATTACGGT AACGCCTTGCTGGTGCTATGGCAGTGAAACCATCGACATGGATCCAACCCGC CCGAAGGCCATTTGGGGCTTTAACGGCACTGAACGCCCCGGCGCTGTTTACC TGGCAGCGGCTCTGGCAGCTCACAGCCAGAAAGGCATCCCAGCATTCTCCAT TTACGGTCATGACGTTTCCAGGATGCCGATGACACATCGATTCTGCCGATGTT GAAGAAAACTGCTGCGCTTTGCCCGCGCCGTTTGGCCGTCGCCAGCATGA AAGGTAAGCTATCTGTCGCTGGGCGGCGTTTCGATGGGTATCGCCGGTTC CATTGTTGATCACAACCTTCTTGAATCCTGGCTGGGAATGAAAGTCCAGGCG GTGGATATGACCGAACTGCGTCGCCGTATCGATCAGAAGATTTACGACGAA GCCGAATTGGAAATGGCACTGGCCTGGGCTGATAAAAACTTCCGCTATGGC GAAGATGAAAATAACAAACAGTATCAACGTAATGCCGAGCAAAGCCGCGCA GTTCTGCGCGAAAGTTTACTGATGGCGATGTGTATCCGCGACATGATGCAAG GCAACAGCAAACCTGGCCGATATTGGTCGCGTGGAAGAATCACTTGGCTACA ACGCCATCGCTGCGGGCTTCCAGGGGCAACGTCCTGGACCGATCAATATCC CAATGGTGACACCGCCGAAGCGATCCTCAACAGTTCATTTGACTGGAATGGC GTGCGCGAACCCTTTGTCGTGGCGACCGAAAACGACAGTCTTAACGGCGTG GCAATGCTAATGGGTCACCAGCTCACCGGCACCGCTCAGGTATTTGCCGATG TGCGTACCTACTGGTCACCAGAAGCAATTGAGCGTGTAACGGGGCATAAAC TGGATGGACTGGCAGAACACGGCATCATCCATTTGATCAACTCCGGTTCTGC TGCGCTGGACGGTTCTGTAAACAACGCGACAGCGAAGGTAACCCGACGAT GAAGCCACACTGGGAAATCTCTCAGCAAGAGGCTGACGCTTGCTCGCCGC TACCGAATGGTGCCCGGCGATCCACGAATACTTCCGTGGCGGCGGTTACTCT TCCCGCTTCTTACCGAAGGCGGCGTCCCGTTACCATGACTCGTGTCAACA TCATCAAAGGCCTGGGACCGGTAAGTCAAAATCGCGGAAGGCTGGAGCGTGG AATTGCCGAAGGATGTGCATGACATCCTCAACAAACGCACCAACTCAACCT GGCCAACCACCTGGTTTGCACCGCGCCTCACCAGTAAAGGGCCGTTTACGGA</p>

	<p>TGTGTACTCGGTAATGGCGAACTGGGGCGCTAACCATGGGGTCTGACCATC GGCCACGTTGGCGCAGACTTTATCACTCTCGCCTCCATGCTGCGTATCCCGG TATGTATGCACAACGTTGAAGAGACCAAAGTGTATCGTCTTCTGCCTGGGC TGCGCACGGCATGGATATTGAAGGCCAGGATTACCGCGCTTGCCAGAATA CGGTCCGTTGTACAAGCGTTAA</p>
AraB	<p>ATGGCGATTGCAATTGGCCTCGATTTTGGCAGTGATTCTGTGCGAGCTTTGG CGGTGGACTGCGCTACCGGTGAAGAGATCGCCACCAGCGTAGAGTGGTATC CCCGTTGGCAGAAAGGGCAATTTTGTGATGCCCCGAATAACCAGTTCGGTCA TCATCCGCGTGACTACATTGAGTCAATGGAAGCGGCACTGAAAACCGTGCTT GCAGAGCTTAGCGTCGAACAGCGCGCAGCTGTGGTCGGGATTGGCGTTGAC AGTACCGGCTCGACGCCCGCACCGATTGATGCCGACGGAAACGTGCTGGCG CTGCGCCCGGAGTTTGCCGAAAACCCGAACGCGATGTTTCGTATTGTGAAA GACCACACTGCGGTTGAAGAAGCGGAAGAGATTACCCGTTTGTGCCACGCG CCGGGCAACGTTGACTACTCCCGCTACATTGGTGGTATTTATTCCAGCGAAT GGTTCTGGGCAAAAATCCTGCATGTGACTCGCCAGGACAGCGCCGTGGCGC AATCTGCCGCATCGTGGATTGAGCTGTGCGACTGGGTGCCAGCTCTGCTTTC CGGTACCACCCGCCCGCAGGATATTCGTCGCGGACGTTGCAGCGCCGGGCA TAAATCTCTGTGGCACGAAAGCTGGGGCGGCCTGCCGCCAGCCAGTTTCTTT GATGAGCTGGACCCGATCCTCAATCGCCATTTGCCTTCCCCGCTGTTCACTG ACACTTGGACTGCCGATATTCGGTGGGCACCTTATGCCCGGAATGGGCGCA GCGTCTCGGCCTGCCTGAAAGCGTGGTGATTTCCGGCGGCGCGTTTGACTGC CATATGGGCGCAGTTGGCGCAGGCGCACAGCCTAACGCACTGGTAAAAGTT ATCGGTACTTCCACCTGCGACATTCTGATTGCCGACAAACAGAGCGTTGGCG AGCGGGCAGTTAAAGGTATTTGCGGTCAGGTTGATGGCAGCGTGGTGCCTG GATTTATCGGTCTGGAAGCAGGCCAATCGGCGTTTGGTGATATCTACGCCTG GTTTGGTCGCGTACTCGGCTGGCCGCTGGAACAGCTTGCCGCCCAGCATCCG GAACTGAAAACGCAAATCAACGCCAGCCAGAAACAACCTGCTTCCGGCGCTG ACCGAAGCATGGGCCAAAATCCGTCTCTGGATCACCTGCCGGTGGTGTCTCG ACTGGTTTAAACGGCCCGCCGACACCGAACGCTAACCAACGCCTGAAAGGGG TGATTACCGATCTTAACCTCGCTACCGACGCTCCGCTGCTGTTCCGGCGGTTT ATTGCTGCCACCGCCTTTGGCGCACGCGCAATCATGGAGTGCTTTACCGATC AGGGGATCGCCGTTAATAACGTGATGGCACTGGGCGGCATCGCGCGGAAAA ACCAGGTCATTATGCAGGCCTGCTGCGACGTGCTGAATCGCCCGCTGCAAAT TGTTGCCTCTGACCAGTGCTGTGCGCTCGGTGCGGCGATTTTTGCTGCCGTCG CCGCGAAAGTGACGCAGACATCCCATCAGCTCAGCAAAAAATGGCCAGTG CGGTAGAGAAAACCTGCAACCGTGCAGCGAGCAGGCACAACGCTTTGAAC AGCTTTATCGCCGCTATCAGCAATGGGCGATGAGCGCCGAACAACACTATCT TCCAACCTCCGCCCGGCACAGGCTGCCAGGCCGTTGCGACTCTATAA</p>
Niap	<p>ATGCCAGCAGCAACCGCACCTGCAAGTGCAGCAGCACGTCTGGAACGTCTG CCATTTTCCGTTATCATAAACGTATTTTTTTTATCATCGCAATCGCCTTTTTT TTTGATTCCGTTGATCTGGGTACCATGACCTTTGTTCTGGGTAGTATTCGTAA AGAATTTGGTCTGAGCACCGCAGCCGACAGGTCTGGTTGCAAGTCAAGTTTT TTTGGTATGGTTCTGGGTGCAGCAGTTGCAGGTCTGCTGGCAGATCGTTTTG GTCGCCGTCCTGTGTTTCAGTGAGTATGGTTCTGTGGGGTGCGGCAAGTTA</p>

	<p>TCTGTGTAGTACGGCCCAGAGCGTTGATGCACTGATTGTTTATCGTGTCTGCTGC TGGGTATTGGTATGGGTATGGAATTTCCGGTTGCGCAGACCCTGCTGTCTGA ATTTGTTCCGACCGAAAAACGTGGTCGTCTGATTGCTCTGATGGATGGTTTTT GGCCTCTGGGTTTTATTACAGCAGGTATTGTTGCATATTTTGTCTGCCGCAG TTTGGTTGGCGTACCGTTTTTGCCTGCTGGCTATTCCTGCCGTTTTTGTCTG GTTGTTTCGTCGTATTGTTCCGGAAAGCCCTCGTTGGCTGGAACATGCTGGTC GTCATGCAGAAGCCGATACTGTTATGCATACCATTGAAGCTAAAGTTATGCG TAGTGCAGGTGTTACGACCCTGCCTCCTCCTAGTCGTCTGGCAGAACCTGCA GCAGCACGCGGTTCGTGGTGCCTGCTGAAATTTGGTCCGGTGTATATCGTC GTCGTACCGTTATGGTTTGGCTGCTGTGGTTTTTTGCCCTGCTGGGTTTTTAT GGTCTGACCAGTTGGCTGGGTGCGCTGCTGCAGCAGGCAGGTTTTGAAGTTA CTAAAAGTGTTTTTTATAACAGTTCTGATCAGCCTGGGTGGTGTTCGGGTTTT CTGTGTGCCGCTTGGCTGGTTGAACGTTGGGGTCGTAACCTACCTGTATTG CGTCTCTGATTGGCGGTGGTGAATGGCTTATGCATATGGTCAGTCTGCGCT GTATGGTGGTTCTACCACCCTGCTGATTGTCACCGGTCTGGCTATGCAGTTTT TTCTGTTTGGTATGTGGGCTGCGCTGTATAACATACGCCGGAACCTGTATGG TACCGGTGCACGTGCTACCGGTAGTGGTTTTGCAAGCGCAATTGGTCGTGTT GGTAGCCTGATTGGTCCGTATGTTGTTGGTGTGTTCTGCCGTTTTTGGTCA GGGTGGTGTGTTACGCTGGGTGCTCTGAGTTTTGTTGCCGCGGCTATTGCG GTTTGGACGCTGGGTATTGAAACGAAAGGTCTGGCGCTGGAACAGCTGGCT GCTGGTGATGATGCAGGTGGTAATGGTCGCTATCCGGCAACCGCAGCTGAT AAAGCAAGTCTCGAG</p>
Nampt	<p>ATGGACAACCTGCTGAACTACTCTTCTCGTGCTTCTGCTATCCCGTCTCTGCT GTGCGACTTCTACAAAACCTCTACCGTATCATGTACCCGGAATGCTCTCAG ATCATCTACTCTACCTTCACCCCGCGTTCTAACGAACAGGCTCCGTACCTGA CCCAGGTTGTTTCTTTCGGTTTCCAGGCTTTCATCATCAAATACCTGATCCAC TACTTCAACGACAACCTTCTTCTCTCGTGACAAACACGACGTTGTTACCGAAT ACTCTGCTTTCATCGAAAAACCTGCAGCTGGAAGACACCGGTGAACACA TCGCTAAACTGCACGAACTGGGTTACCTGCCGATCCGTATCAAAGCTATCCC GGAAGGTAACCGTTGCTATCAAAGTTCCGGTTATGACCATCGAAAACAC CCTACTGACTTCTTCTGGCTGACCAACTACCTGGAAACCTGATCAACGTT TCTCTGTGGCAGCCGATGACCTCTGCTTCTATCGCTTTCGCTTACCGTACCGC TCTGATCAAATTCGCTAACGAAACCTGCGACAACCAGGAACACGTTCCGGTTC CAGTCTCACGACTTCTCTATGCGTGGTATGTCTTCTCTGGAATCTGCTGAAAC CTCTGGTGCTGGTCACCTGACCTCTTCTGGGTACCGACACCATCCCGGCTC TGCTTTTCGTTGAAGCTTACTACGGTCTTCTTCTCTGATCGGTACCTCTATC CCGGCTTCTGAACACTCTGTTATGTCTTCTCACGGTGTGACGAACTGTCTAC CTTCCGTTACCTGATGGCTAAATTCCCGCACAACATGCTGTCTATCGTTTCTG ACACCACCGACTTCTGGCACAACATCACCGTTAACCTGCCGCTGCTGAAACA GGAAATCATCGCTCGTCCGGAAACGCTCGTCTGGTATCCGTCCGGACTCT GGTAACTTCTTCGCTATCATCTGCGGTGACCCGACCGCTGACACCGAACACG AACGTAAAGGTCTGATCGAATGCCTGTGGGACATCTTCGGTGGTACCGTTAA CCAGAAAGGTTACAAAGTTATCAACCCGCACATCGGTGCTATCTACGGTGAC GGTGTACCTACGAAAAAATGTTCAAAATCCTGGAAGGTCTGCAGGCTAAA</p>

	GGTTTCGCTTCTTCTAACATCGTTTTTCGGTGTGGTGCTCAGACCTACCAGCG TAACACCCGTGACACCCTGGGTTTTCGCTCTGAAAGCTACCTCTATCACCATC AACGGTGAAGAAAAAGCTATCTTCAAAAACCCGAAAACCGACGACGGTTTC AAAAAATCTCAGAAAGGTCGTGTTAAAGTTCTGTCTCGTGACACCTACGTTG ACGGTCTGACCTCTGCTGACGACTTCTCTGACGACCTGCTGGAAGTCTGTT CGAAGACGGTAAACTGCTGCGTCAGACCGACTTCGACGAAATCCGTCAGAA CCTGCTGGTTTTCTCGTACCACCCTG
PnuC	ATGGTGCGTAGCCCTCTGTTTCTGCTGATTAGCTCAATTATTTGTATCCTGGT TGGTTTTTATATCCGTAGCTCCTATATTGAAATCTTTGCCTCCGTTATGGGTA TTATTAACGTTTGGCTGCTGGCACGTGAAAAAGTTTCTAACTTTCTGTTTGGT ATGATCACTGTTGCGGTGTTTCTGTATATTTTTACCACCCAGGGTCTGTATGC AATGGCTGTTCTGGCAGCATTTTCAGTTTATTTTAAATGTATATGGTTGGTATT ATTGGATCGCACGTAGCGGCGAAGAAAAAGTTAAACCGACCGTTCGCCTGG ATCTGAAAGGTTGGATTATTTATATTCTGTTTATCCTGGTCGCGTGGATTGGT TGGGGTTATTATCAGGTTTCGCTATCTGGAAAGCACCAATCCGTATCTGGATG CACTGAATGCAGTTCTGGGCCTGGTTGCACAGTTTATGCTGTCTCGTAAAT TCTGGAAAAGTGGCATCTGTGGATTCTGTATAATATTGTTAGCATTGTGATCT ATATCAGCACCGGTCTGTATGTTATGCTGGTTCTGGCGATTATTAATCTGTTT CTGTGTATCGATGGTCTGCTGGAATGGAAAAAGAACCATAAAGAACGCGAA CGTGTGAATAACTATATTCTCGAG