

Fig. S1. Putative biosynthetic pathway of cembrane-derived polycyclic diterpene in nasute termite.

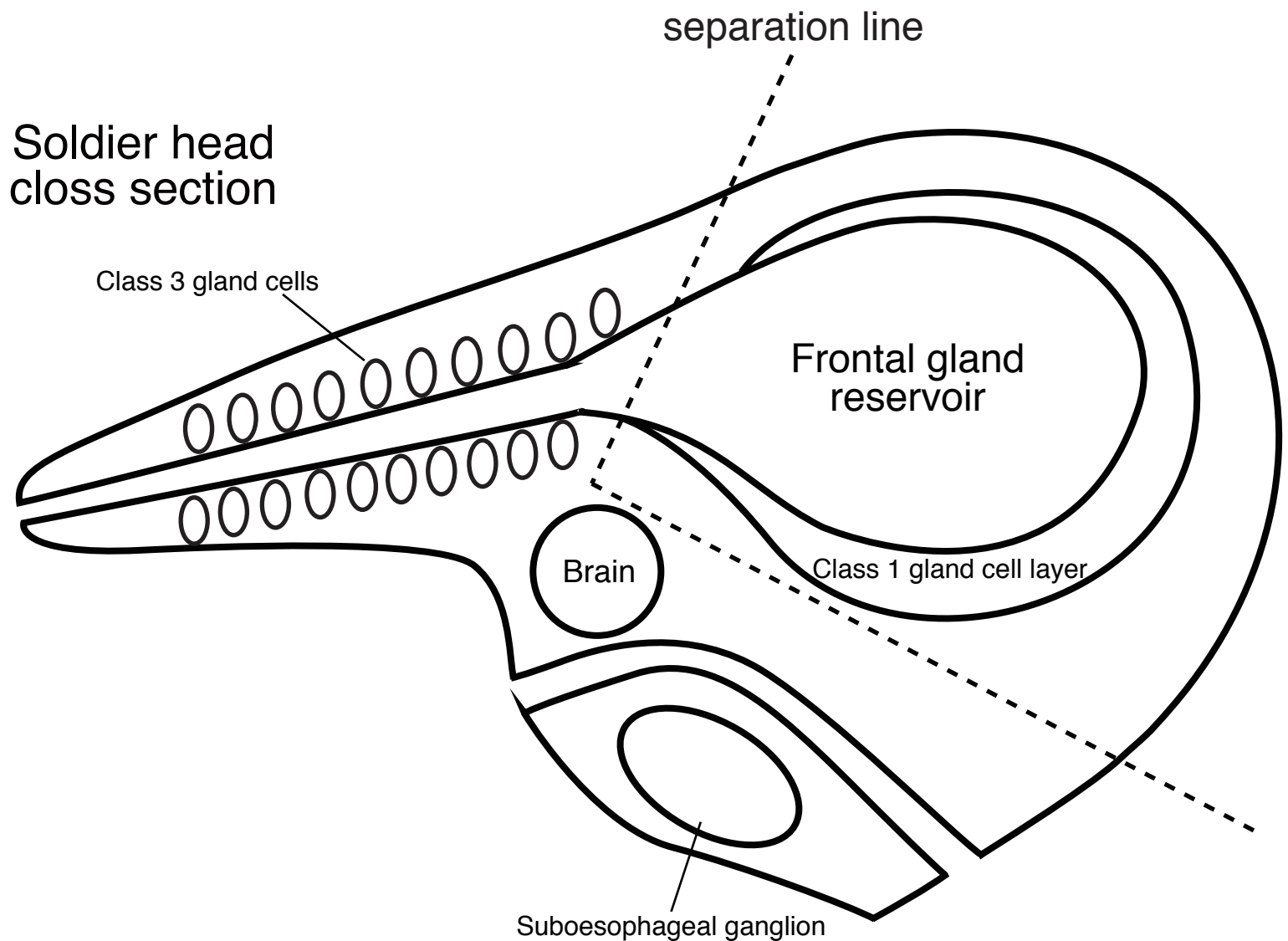


Fig. S2. Diagram of separation of soldier head used for RNA extraction for RNA-seq library construction.

NiGGPPS2-B AAAAGCCG CAGTTTGGTT - - -GTTTAA AATTGGGCTGCTGCAGCTTCTGAGTGACAACAA
NiGGPPS3-B AAAAGCTGGATTTTGGTT - - -GTTTAA AATTGGGCTGCTGCAGCTTCTGAGTGACAACAA
NiGGPPS4 AAAATTGGCAAGTTTGGTT - - -GTTTAGAGTT CGACTGATGCAGCTTGTGAGTGACAATAA
NiGGPPS5 AAAAACAGGAGCATTGTT CAGTCTTGGAATCCAACTGATGCAGCTGTTT AGTGAGAATAA
NiGGPPS6 AAAAACGGCGAGGGTTCAAGTTTGGTGTACAAATAGTT CAGCTGTTTAGCGAGAATAA
NiGGPPS7 AAAAACCGGGGGACTGTTTATGCTTGCAATCCGACTCATGCAGCTGTTT AGTGACAATAA

NiGGPPS1-B AACTGACTT CACCAA AACTAAATAGAATCATGCAATTG TACTGGCAGATT CGGGATGACTA
NiGGPPS2-B AATTGACTT CACCAA AACTAAATAGCATCTTGGCAATGTACATCCAGATT CGTGATGACTA
NiGGPPS3-B AATTGACTT CACCAA AACTAAATAGCATCTTGGCAATGTACGTCCAGATT CGGGAGGACTA
NiGGPPS4 AACTGACTA CACCAA AACTAAATAGCATCTTGACAATGTACTACCAGTTT CGGGATGACTA
NiGGPPS5 AGCTGACTT CACAAA AACTGAGTGGCATCTTGGGGCTCTACTACCAGATCTCCAATGACTA
NiGGPPS6 AGCTGACCT CACGAA AAGTGGCTGAGCTCCTTGGGCAGTACTTCCAGATTAGAGATGACTA
NiGGPPS7 AGCTGACTT CACCAA AACTAACTGGCATCTTGGGGCTGTACTTCCAGATT CGGGATGACTA

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NiGGPPS2-B CTGCAATCTATGTCTGCAACAGTATACAGATGAAAGAGGCTACTGTGAGGACATCACAGA
NiGGPPS3-B CTGCAATCTATGCCTGCAACAGTATGCAGATGAAAGAGGCTACTGTGAGGACATCTCAGC
NiGGPPS4 CTGCAATCTATGTCTGCAACAGTATACAAATCAAAAAGGCTACTGTGATGACATCTCAGA
NiGGPPS5 TCGCAATCTTTGTTGGCA - - - - -GGAGGACAAATGTTACTGTGAAGATCTCACAGA
NiGGPPS6 CTGCAGTCTGTGTCTGCACCAGTATTACAGAAAGAAAGGCTACTTAGAAGATATTACAGA
NiGGPPS7 CTGCAATCTGTGTCTGCAGGAGTATTACAGAGAACAAAAGCTACTGTGAAGACCTCACAGA

NiGGPPS1-B AGGCAAGTT CAGTTTCCCAATAATCCATGCTATACTGAATAATCCAGATGACCAACAGGT
NiGGPPS2-B AGGCAAGTTAAGTTTCCCAATAATCCATGCTATAAGGAGACATCCAGATGACCAACAGGT
NiGGPPS3-B AGGCAAGTTTAGTTTCCCAATAATCCATGCTATAATGAGTCATCCAGATGACCAACAGGT
NiGGPPS4 AGGCAAGTTTAGTTTCCCAATAATCCATGCTATAACAAATCATCCAGATGACCAACAGGT
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NiGGPPS6 AGGGAAGTTTAGTTTCCCAATAATCCATGCTATAAATAGTCGCCAGATGATAACAGGT
NiGGPPS7 AGGCAAGTTTAGTTACCCAATCATCCATGCTATAAAGAGTCGTCCAGATGACAATCAGGT

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NiGGPPS2-B GATACATATCCTGCGACAACGAACTCGCGATGTGGAAC TGAAGAAATACTGCTTTACATT
NiGGPPS3-B GATACATATCCTCCGACAACGAACTCGCGATGTGGAAC TGAAGAAATACTGCTTTACATT
NiGGPPS4 GATAAATATCCTGCGACAACGAACTCAAAAGGTTGAATTGAAGAAATACTGTATGACATT
NiGGPPS5 GATATGTATCCTGCGACAACGAACTCATGATGTGGAATTGAAGAAATACTGCGTTACATT
NiGGPPS6 GTTAAGTATCCTGCGACAACGAACTGAGGATGTAGAATTGAAGAAAGTACTGCCTTACATT
NiGGPPS7 GATGCATATACTGCGTCAACGAACTCGGGATGTGGAAGTAAAGAAAGTACTGTATTACATT

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NiGGPPS2-B GCTGGAAAAGTTTGGTCTTTTAGTTACACGAGGCATATTTCTTAAGGAGCTTGATGCTGA
NiGGPPS3-B GCTGGAAAAGTTTGGTCTTTTAGTTACACGAGGCGTATTTCTTAAGGAGATGGATGCTGA
NiGGPPS4 GCTGGAAAAGTTTGGGTCTTTAGTTTACAGAGGCATACTCTTGAGGAGCTTGATGCTGA
NiGGPPS5 GCTGGAAAAATCTGGGTCTTTAGTTTACACAAGGCATACACTTGAGGAGCTTGATGCTGA
NiGGPPS6 GCTGGAAAATTTTGGGTCTTTAGGTATACCAGGCATACTCTTGAGAAAATTGATGCCGA
NiGGPPS7 GCTGGAGAAGTTTGGGTCTTT CAGTCACACAAGGCACCTTCTTGAAGAGCTGGATGCTGA

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NiGGPPS2-B AGCGAGGGCTGAGGTTGCTAAACTTGGAGGCAATCCAGTGCTAGAAAATGTTCTGAATGA
NiGGPPS3-B AGCAAGGGCTGAGGTTGCTAAACTTGGAGGCAATCCAGTGCTAGAAAATGTCTCTGAATGA
NiGGPPS4 AGCAAGGGCTGAGGTTGCTAAACTTGGAGGCAATCCAGTGCTAGAAAATGTCTCTGAATGA
NiGGPPS5 AGCAAGGGCTGAGGTGGCTAAACATGGAGGCAATCCAGTGTTAGAAGATATCCTGGATAA
NiGGPPS6 ATTAAGGGCTGAGATAGCTAAACTTGGAGGCAATCCAATCCTAGAAGATGTATGGATCA
NiGGPPS7 AGCAAGGACTGAGGTCTCTAAACTTGGGGGCAATCCACTGTTAGAAGATATCCTGAATGA

NiGGPPS1-B AATGCTGGACTGGAAGAAGAACAGAGATGACAAGAACCAGAGCAGTGAggctttt g t g t
NiGGPPS2-B ACTGCTGGACTGGAAGAAGGACGAAGATGACAAGAATCCAGAGCAGTGAggctctt g t g t
NiGGPPS3-B ACTGCTGGACTGGAAGAAGGACGAAGATGACAAGAATCCAGAGCAGTGAggctctt g t g t
NiGGPPS4 AATGCTGGACTGGAAGAAGGACAGAGATGACAAGAACCAGAGCAGTGAggctttt g t g t
NiGGPPS5 AATGCTTGAATGGAAGAGGTGCAGTATGAGAACAAGCCAGTGCTGTGAgggtctt t t a t
NiGGPPS6 AATGTTGAAC TGAAGAATGGCACAAGTGGGAAGCACACGGAAGAGTGAggatctt g t g t
NiGGPPS7 ACTGCTGAGCTGGAAGAGGAGGTCAGATGACAAGAACCAGAGCAGTGAggatctt g t g t

NiGGPPS1-B t c c t g c a a g t a a t g t c a g a a c t g t t t a t g t g t g g c t - - - - -
NiGGPPS2-B t c c c g c a a t t a a t g t t a g t a c t c t t t a t g t g t g g c t - - - - -
NiGGPPS3-B t c c c g c a a t t a a t g t t a g t a c t g t t t a t g t g t g g c t - - - - -
NiGGPPS4 t c c t g c a a g t a a t g t c a g t a c c g t t t a t g t g t g g c t t g c a a a t t a a t a t c t a t c t g g t a t
NiGGPPS5 t g c c a c a a g t a a t g t c a g t a g t t t t c a t g t g t c g c t - - - - -
NiGGPPS6 t t t c a t g a g t a a t t t c a g t a g t t t t c a t g t g t a g c t - - - - -
NiGGPPS7 t g c c a c a a g t a - t c t c a a t a g t g t t c a t g t g t a g c t - - - - -

NiGGPPS1-B - - - - -
NiGGPPS2-B - - - - -
NiGGPPS3-B - - - - -
NiGGPPS4 t t t g a c t t t a a c c c t t a t c c t g t t a a c g t g g a g a a t a t a g t g a a c t c c t a a c a a t g c t a g
NiGGPPS5 - - - - -
NiGGPPS6 - - - - -
NiGGPPS7 - - - - -

NiGGPPS1-B - - - - - t g c a a a t t a a t a t t - a t c t g t t a t t t t g a - c t t t a a t g g t t g c t c a g a a c a t g a t
NiGGPPS2-B - - - - - t c c a a a t t a a t a t t t a t c t g t t a t t t t g a - g t t t a a t g g t t g c t g a a a a c a t g a t
NiGGPPS3-B - - - - - t c c a a a t t a a t a t t t a t c t g t t a t t t t g a - g t t t a a t f g t t g c t g a a a a c a t g a t
NiGGPPS4 c a t a t g g c a g a t g g g a t t t a a c t c g g c g t t t a a a a g g t t a a t g g t t g c t c a g g a c a t g a t
NiGGPPS5 - - - - - g g t g g c t a a t c c a t a t c c g t t a c t a t t a t t a c a a g g t t g c t c - - - - -
NiGGPPS6 - - - - - g g t g g c t a a t t c a t a t c t t c a t t g t t a t t t t t t g g g t c a a g a a g a a - - - - -

NiGGPPS7 - - - - - g g t g g c t g t t t c a t g t c t g t t a t c a a t a c a t t a c a g g g t t g c t c c a a c c a c a a a

NiGGPPS1-B a a g a g a t t g t g a t a t a c a t t t g t t t a c a t g t t t g t c c a g c a t g g g c a t t t t t t a t g g t g c

NiGGPPS2-B a a g a g a t t g t g a c a t g c a t t t g t t t a c a t g t t t g t c c a g c a t g g g c a t t t t t t a t g g t g c

NiGGPPS3-B a a g a g a t t g t g a c a t g c a t t t g t t t a c a t g t t t g t c c a g c a t g g g c a t t t t t t a t g g t g c

NiGGPPS4 a a g a g a t t g t g a c a t a c a t t t g t t t a c a t g t g t g t c c a g c a t g g g c a t t t t t t a t g g t g c

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 a c a a g a t t g t g g g a a a t g t a t g c t c a c a t g t t t g t g c a g t t t g g g c a t t t t t c a t g g t g c

NiGGPPS1-B c c a c t c c a t a t a a t a t t t g t t a c t g a a t g t g a t t c t t t t a t g t a a a a a a t a t g t t a a a

NiGGPPS2-B c c a c t c a a t a t a a t a t t t g t t a c t g a a t g t g a t t c t t t t a t g t c a a a a a a t a t a t t a c t

NiGGPPS3-B c c a c t c a a t a t a a t a t t t g t t a c t g a a t g t g a t t c t t t t a t g t c a a a a a a t a t a t t a c t

NiGGPPS4 c c a c t c c a t a t a a t a t t t g t t a c t g a a t g t g a t t c t t t t a t g t c a a a a a a t a t g t t a a t

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 c c a c t a c a t g c a t t a t t t g t t a t t a a a t t t t a t c c a c t - - - - -

NiGGPPS1-B g a c c c a g a g c a g a t t t g t t g c a g a t t t t t a c c a t a a t g t t t c t c t a t t c c t t g a a t g t t t

NiGGPPS2-B g a c c c a g a g c a g a t t t g c t g c a g a t t t g t a c c a t a a t g t t t c t c t a t t c a t t g a a t g t t t

NiGGPPS3-B g a c c c a g a g c a g a t t t g c t g c a g a t t t g t a c c a t a a t g t t t c t c t a t t c a t t g a a t g t t t

NiGGPPS4 g a c c c a g a g c a g a t t t g c t g c a g a t t t a t a c c a t a a t g t g t c t c t a t t c - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B a g a a g g c c a t t c t t a a a a g t g t c a t g g g c a g t g t g c a t t t a t c a g t a t g a t g t c a c a t t t

NiGGPPS2-B a g a a g g c c a t t c t t a a a a g t g t t g t g g c c a t t g t g c a t t t a t c a g t a t g a t g t c a c a t t t

NiGGPPS3-B t g a a g g c c a t t c t t a a a a g t g t t g t g g c c a t t g t g c a t t t a t c a g t a t g a t g t c a c a t t t

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B t t a t a g g c a t t c c t a a t g t g g a a t t c a t c c a a a t t a t t t t a g g t g a g a g c a t g g t a a a a t

NiGGPPS2-B t t a t a g g c a t t c c t a a t g g g g a a t t c a t c c a c a t t a t g t t t t g t g a g a g c a t g g t a a a a t

NiGGPPS3-B t t a t a g g c a t t c c t a a t g g g g a a t t c a t c c a c a t t a a g t t t t g t g a g a g c a t g g t a a a a t

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B t g a c c a a t t t g t c a a t a a a g a a t g c c t t g t a a t g g a a t g g t a t t a t t t g t c a t t c c t g a g

NiGGPPS2-B t g a t c a t t t t g t c c a t a a a g a g t g c c t t g t a a t g g a a t g g t a t t a t t t g t c a c t c c t g g g

NiGGPPS3-B t g a t c a t t t t g t c c a t a a a g a g t g c c t t g t a a t g g a a t g g t a t t a t t t g t c a t t c c t g g g

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B a g c a t t c t a c a a c t g t a g t t c c t g t c t g a c a t t t g t t t c t t t a c t g t a a g a a a t t t t g

NiGGPPS2-B c a c a t t c t a c t a c t g t a a g t g c c a t c t a a g t a t t a c a g g g t a t a a a g t g c t a t g t t t g a c

NiGGPPS3-B c a c a t t c t a c t a c t g t a a g t g c c a t c t a a g t a t t a c a g g g a a t a a a g t g c t a t g t t t g a c

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B t g t t a a t g g a t a a c c a g g a a t t g c a a t a t t t t c a c t g a t g t g a a g a g g g g t t g g t a c t g c

NiGGPPS2-B a t t g g c a g g a c c g t g c a t c a t c a t t t a a t a a a a t c a g a a t t g t c c c t - - - - -

NiGGPPS3-B a t t g c - - - - -

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B a c a t t g c a a a g t t g c a t g c a c c a a c c t a g t a a t g t g c a a a t t a g a a t a g c a t g a t a t a t t

NiGGPPS2-B - - - - -

NiGGPPS3-B - - - - -

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

NiGGPPS1-B g c t g t a c a t t c a t a a g t a a a a a g a a a a t a t g t g t

NiGGPPS2-B - - - - -

NiGGPPS3-B - - - - -

NiGGPPS4 - - - - -

NiGGPPS5 - - - - -

NiGGPPS6 - - - - -

NiGGPPS7 - - - - -

Fig. S3. Nucleotide sequence alignment of GGPPS genes of *N. takasagoensis*. Forward and reverse primers are underlined and double-underlined, respectively. Capital letters and small capital letters indicate the sequences of coding regions and untranslated regions, respectively. Asterisks indicate the sequences of start and stop codon.

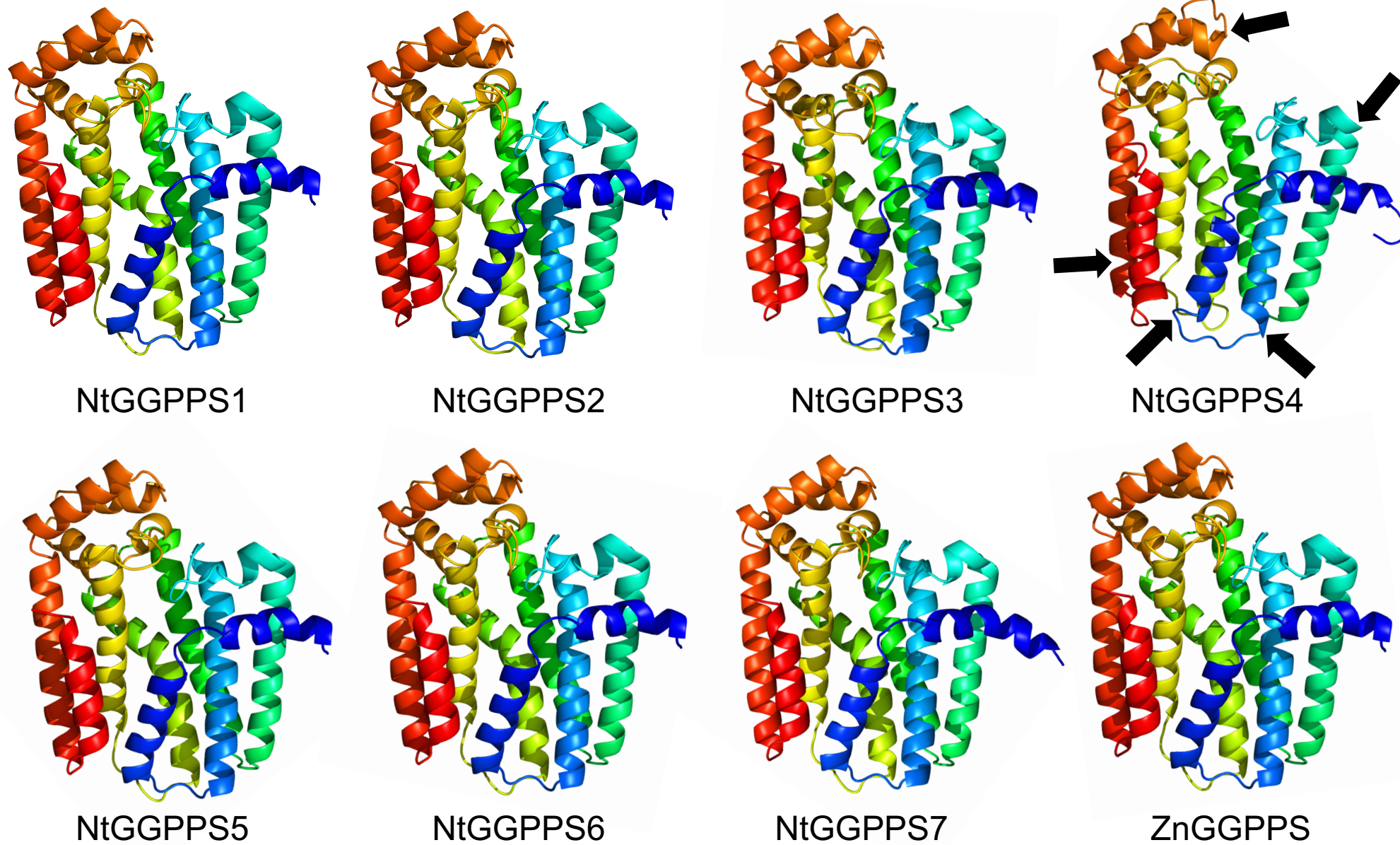


Fig. S4. Comparison of the 3D protein structures of GGPPSs in *N. takasagoensis* (NtGGPPSs) and *Z. nevadensis* (ZnGGPPS).