**Supplementary information**

Supplemental Table S1. Information of ST3Gal IV overexpression vector.

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| Gene | ST3GAL4 |
| Accession number | NM\_001254757.2 |
| Cloning vector | pcDNA3.1(-) |
| Insert size | 1002bp (CDS region: 218-1219) |
| Insert sequence | ATGGTCAGCAAGTCCCGCTGGAAGCTCCTGGCCATGTTGG 40CTCTGGTCCTGGTCGTCATGGTGTGGTATTCCATCTCCCG 80GGAAGACAGGTACATCGAGCTTTTTTATTTTCCCATCCCA 120GAGAAGAAGGAGCCGTGCCTCCAGGGTGAGGCAGAGAGCA 160AGGCCTCTAAGCTCTTTGGCAACTACTCCCGGGATCAGCC 200CATCTTCCTGCGGCTTGAGGATTATTTCTGGGTCAAGACG 240CCATCTGCTTACGAGCTGCCCTATGGGACCAAGGGGAGTG 280AGGATCTGCTCCTCCGGGTGCTAGCCATCACCAGCTCCTC 320CATCCCCAAGAACATCCAGAGCCTCAGGTGCCGCCGCTG 360TGTGGTCGTGGGGAACGGGCACCGGCTGCGGAACAGCTCAC 400TGGGAGATGCCATCAACAAGTACGATGTGGTCATCAGATT 440GAACAATGCCCCAGTGGCTGGCTATGAGGGTGACGTGGGC 480TCCAAGACCACCATGCGTCTCTTCTACCCTGAATCTGCCC 520ACTTCGACCCCAAAGTAGAAAACAACCCAGACACACTCCT 560CGTCCTGGTAGCTTTCAAGGCAATGGACTTCCACTGGATT 600GAGACCATCCTGAGTGATAAGAAGCGGGTGCGAAAGGGTT 640TCTGGAAACAGCCTCCCCTCATCTGGGATGTCAATCCTAA 680ACAGATTCGGATTCTCAACCCCTTCTTCATGGAGATTGCA 720GCTGACAAACTGCTGAGCCTGCCAATGCAACAGCCACGGA 760AGATTAAGCAGAAGCCCACCACGGGCCTGTTGGCCATCAC 800GCTGGCCCTCCACCTCTGTGACTTGGTGCACATTGCCGGC 840TTTGGCTACCCAGACGCCTACAACAAGAAGCAGACCATTC 880ACTACTATGAGCAGATCACGCTCAAGTCCATGGCGGGGTC 920AGGCCATAATGTCTCCCAAGAGGCCCTGGCCATTAAGCGG 960ATGCTGGAGATGGGAGCTATCAAGAACCTCACGTCCTTCT 1000GA 1002 |