

**Table S1. Related to Figures 1-3. Sequences used in this study for biochemical characterization.**

Name	Sequence (5' to 3')	Figure
cr1	CACCCGUGCAAAAUGCAGGGGUCUAAAACGACCUGAAUAUUUCAGA UCAAA	2A-C; 3A; S4A-G
cr2	CACCCGUGCAAAAUUGCAGGGGUCUAAAACUUUGAUCUGAAAUAUUC AGGUC	2A
cr3	CACCCGUGCAAAAUGCAGGGGUCUAAAACUGAGCGGAUAACCUCUCU AUGG	3A; S4E
cr4	CACCCGUGCAAAAUGCAGGGGUCUAAAACGAGACCUGAAUAUUUCA GAUCA	3A; S4E
cr5	CACCCGUGCAAAAUGCAGGGGUCUAAAACAUUGUGAGCGGAUAACC UCUCU	3A; S4E
cr6	CACCCGUGCAAAAUGCAGGGGUCUAAAACAACCUCUCUAUGGGCAGU CGGU	3A; S4E
cr7	CACCCGUGCAAAAUGCAGGGGUCUAAAACUGAAUAUUUCAGAUCAA AUCGU	3A; S4E
cr8	CACCCGUGCAAAAUGCAGGGGUCUAAAACGAAUAUUUCAGAUCAAA UCGUA	3A; S4E
cr9	CACCCGUGCAAAAUGCAGGGGUCUAAAACAAUAUUUCAGAUCAAAU CGUAG	3A; S4E
cr10	CACCCGUGCAAAAUGCAGGGGUCUAAAACAUUUUCAGAUCAAAUC GUAGG	3A; S4E
cr11	CACCCGUGCAAAAUGCAGGGGUCUAAAACAGUCGGUGAUGUACGAG ACCUG	3A; S4E
cr12	CACCCGUGCAAAAUGCAGGGGUCUAAAACGUCGGUGAUGUACGAGA CCUGA	3A; S4E
cr13	CACCCGUGCAAAAUGCAGGGGUCUAAAACUCGGUGAUGUACGAGACC UGAA	3A; S4E
cr14	CACCCGUGCAAAAUGCAGGGGUCUAAAACCGGUGAUGUACGAGACCU GAAU	3A; S4E
cr15	CACCCGUGCAAAAUGCAGGGGUCUAAAACAUAUUUCAGAUCAAAUC GUAGG	3B
cr16	CACCCGUGCAAAAUGCAGGGGUCUAAAACGACCUGAAUAUUUCAGA UCAAAAACGUAGGA	S4A,B

cr17	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UCAAAACGU	S4A,B
cr18	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UCAAAAC	S4A,B
cr19	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UCAAA	S4A,B
cr20	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UCAA	S4A,B
cr21	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UCA	S4A,B
cr22	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA UC	S4A,B
cr23	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA U	S4A,B
cr24	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAGA	S4A,B
cr25	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCAG	S4A,B
cr26	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUCA	S4A,B
cr27	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUUUC	S4A,B
cr28	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AUU	S4A,B
cr29	CACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU A	S4A,B
cr30	CACCCGUGCAAAA AUGCAGGGGUCUAAAACCUAUCUUCACACUCACGC AUUG	S4H
Array 1	GAACUACACCCGUGCAAAA AUGCAGGGGUCUAAAACGACCUGAAU AU UUCAGAUCAAAA UAGCAAUGAACUACACCCGUGCAAAA AUGCAGGGG UCUAAAACA UUCUUAUCUAAA UAGCAUAUGCUUCUGU	1C, 2A
Array 2	GAACUACACCCGUGCAAAA UUGCAGGGGUCUAAAACGACCUGAAU AU UUCAGAUCAAAA UAGCAAUGAACUACACCCGUGCAAAA UUGCAGGGG UCUAAAACA UUCUUAUCUAAA UAGCAUAUGCUUCUGU	2A,B
ssRNA1	UACGUACGCCAUCUCAUCCUGCGUGUCUCCUACGAUUUGAUCUGAAA UAUUCAGGUCUCGUACAUCACCGACUGCCCAUAGAGAGGUUAUCCGCU CACAAUCCACACAACAUACGAGCCGGAAGCAUAAAG	2A,B; 3A; S4A,B,E,F,G
ssRNA2	GCCAAGAGAUUCGACCUGUACUCCUUAUUAACAACAUCGACCCUGAG UAUGAGUUAUCCAGUGUAUCCUUCAGUGGAGGAGAGGCUGAAGAGC AUCAACAAGACUUUAUUGAGGACAACAGAGUAUGCAU	2C
ssRNA3	GCCGCCAAAAGGCGGCCCUACGAUUUGAUCUGAAAUAU	3B

ssRNA4	GCCGCCUUUUUGGCGGCCCUACGAUUUGAUCUGAAAUAU	3B
ssRNA5	GCCGCCCCCGGCGGCCCUACGAUUUGAUCUGAAAUAU	3B
ssRNA6	GCCGCCGGGGGGGCGGCCCUACGAUUUGAUCUGAAAUAU	3B
ssRNA7	AAAAAGAAAAAGAAAAACCUACGAUUUGAUCUGAAAUAU	3B
ssRNA8	UUUUUCUUUUUCUUUUUCCUACGAUUUGAUCUGAAAUAU	3B
ssRNA9	CCCCUCCCCCUCCCCCCUACGAUUUGAUCUGAAAUAU	3B
ssRNA10	GGGGGAGGGGGAGGGGGCCUACGAUUUGAUCUGAAAUAU	3B
ssDNA1	TACGTACGCCATCTCATCCCTGCGTGTCTCTACGATTTGATCTGAAATA TTCAGGTCTCGTACATCACCGACTGCCCATAGAGAGGTTATCCGCTCACA ATTCCACACAACATACGAGCCGGAAGCATAAAG	S4C
dsDNA1	TACGTACGCCATCTCATCCCTGCGTGTCTCTACGATTTGATCTGAAATA TTCAGGTCTCGTACATCACCGACTGCCCATAGAGAGGTTATCCGCTCACA ATTCCACACAACATACGAGCCGGAAGCATAAAG	S4D
ssRNA13	UACGUACGCCAUCUCAUCCUGCGUGUCUCCUACGUUUUGAUCUGAAA UAUUCAGGUCUCGUACAUCACCGACUGCCCAUAGAGAGGUUAUCCGCU CACAAUCCACACAACAUACGAGCCGGAAGCAUAAAG	S4F
ssRNA14	UACGUACGCCAUCUCAUCCUGCGUGUCUCCUACGCUUUGAUCUGAAA UAUUCAGGUCUCGUACAUCACCGACUGCCCAUAGAGAGGUUAUCCGCU CACAAUCCACACAACAUACGAGCCGGAAGCAUAAAG	S4F
ssRNA15	UACGUACGCCAUCUCAUCCUGCGUGUCUCCUACGGUUUGAUCUGAAA UAUUCAGGUCUCGUACAUCACCGACUGCCCAUAGAGAGGUUAUCCGCU CACAAUCCACACAACAUACGAGCCGGAAGCAUAAAG	S4F
ssRNA16	CCUGGAUUCGAGAAGAAGAAUGCCAGCGAUCUGCUGUACUUCAGCAA GAUCAAUGCGUGAGUGUGAAGAUAGAUCUCGAUGGCAAGGAGAUCAA CGAUCUCCUGACCACACUGAUCAGCAAGAUCGCGAAUC	S4H

**Table S3. Related to Figure 5. shRNAs used in this study.**

Name	Sequence (5' to 3')	Figure
B4GALNT1 shRNA 1	GGCCGCCGGGCCUGUGCGCUCUCGAGAGCGCACAGGGCCCCGGCGGCC	5D
B4GALNT1 shRNA 2	UCGCGGGGCUCCUGUACGCGCUCGAGCGGUACAGGAGCCCCAGCGA	5D
B4GALNT1 shRNA 3	AGGCAGCUUCUGGUCAGGAGGCUCGAGCCUCCUGACCAGAAGCUGCCU	5D, 5E
B4GALNT1 shRNA 4	AGGAUCAAGGAGCAAGUAGUGCUCGAGCACUACUUGCUCUUGAUCCU	5D
ANXA4 shRNA 1	ACUGAUGAGGGCUGCCUAAUUCUCGAGAAUAGGCAGCCCUCAUCAGU	5D
ANXA4 shRNA 2	GAGAUCAAGGAGCCUACAAGCUCGAGCUUGUAGGCUGUCCUGAUCUC	5D
ANXA4 shRNA 3	UGAGGAGAUCCGGCGCAUAAGCUCGAGCUUAUGCGCCGGAUCUCCUCA	5D
ANXA4 shRNA 4	GGAGCCUUGAAGAUGACAUCCUCGAGGAAUGUCAUCUUCAAGGCUC	5D, 5G, 5A

HOTTIP shRNA 1	CAUUUAGGAGCCCCUAUCCUCUCGAGAGGGAUAGGGGCUCCUAAAUG	5D
HOTTIP shRNA 2	ACUGGAGGCUUGGACUGCAUUCUCGAGAAUGCAGUCCAAGCCUCCAGU	5D
HOTTIP shRNA 3	ACUGUUAGUGAGCAAUUUCAUCUCGAGAUGAAAUUGCUCACUAACAGU	5D
Non-targeting shRNA	UAGAUUGCUGUUCUACCAAGUCUCGAGACUUGGUAGAACAGCAAUCUA	5D, 5E, 5G, S5A

**Table S4. Related to Figures 4-6. qPCR probes used in this study for gene expression analysis.**

Transcript	Probe ID	Primer 1	Primer 2	Figure
<i>GAPDH</i>	4326317E	-	-	4D, 5B, 5D, 5H, 6F, S6A, S6B
<i>EZH2</i>	Hs00544830_m1	-	-	5H, S6
<i>EGFR</i>	Hs01076090_m1	-	-	5H
<i>HRAS</i>	Hs00978050_g1	-	-	5H
<i>KRAS</i>	Hs00364284_g1	-	-	5H
<i>NF2</i>	Hs00966302_m1	-	-	5H
<i>NRAS</i>	Hs00180035_m1	-	-	5H
<i>NFKB1</i>	Hs00765730_m1	-	-	5H
<i>PPARG</i>	Hs01115513_m1	-	-	5H
<i>RAF1</i>	Hs00234119_m1	-	-	5H, S6
<i>STAT3</i>	Hs00374280_m1	-	-	5H, S6
<i>SMARCA4</i>	Hs00231324_m1	-	-	5H, S6
<i>TP53</i>	Hs01034249_m1	-	-	S6
<i>B4GALNT1</i>	Hs01110791_g1	-	-	4D, 5B, 5D
<i>B4GALNT1</i> (Custom IDT)	56-FAM/AGCTGACCA/ZEN/ GCTGCTCATAGCC/3IABkFQ/	CTGAACTTCC ACACCCTGTA G	GTCAGGATCAA GGAGCAAGTAG	5D
<i>B4GALNT1</i> (Custom IDT)	56-FAM/TGCGCTCTG/ZEN/ GTCCTTCTGCT/3IABkFQ/	CACGGCGCA AGAGGTAG	CTTAGAGCGTT AGACAGGATGT G	5D
<i>ANXA4</i>	Hs00984879_m1	-	-	5B, 5D
<i>ANXA4</i> (Custom IDT)	56-FAM/CCGATGGTG/ZEN/ CTCTTGTAGGCTGTC/3IABkFQ/	CCTTGCCTAC CGCAACA	TCAATTAGGCA GCCCTCATC	5D
<i>ANXA4</i> (Custom IDT)	56-FAM/AGGCCAGGA/ZEN/ TCTCAATTAGGCAGC/3IABkFQ/	GCTTATGCGC CGGATCT	GATCAGGACAG CCTACAAGAG	5D
<i>MALAT1</i> (Custom IDT)	56-FAM/TGGGAGTGG/ZEN/ TAGGATGAAACAATTTGGAG/ 3IABkFQ/	CCGTACTTCT GTCTTCCAGT TT	GAATTGCGTCA TTTAAAGCCTA GT	5B
<i>HOTTIP</i>	Hs00955374_s1	-	-	5B, 5D
<i>MAPT 3R</i>	Hs00902192_m1	-	-	6F
<i>MAPT 4R</i>	Hs00902312_m1	-	-	6F