

Appendix 1. Primers used for PCR amplification and sequencing of *FZD4*, *NDP*, *TSPAN12* and *LRP5*

Exon number	Exon	Forward primer(5'-3')	Reverse primer(5'-3')	Amplicon size(bp)	Annealing temperature (°C)
	<i>FZD4</i>				
1	5'UTR	GTGGGAGGAAAGCAAGAGC	GAGCAACCCCAGACTGAGAC	622	59
2	EXON1	GGGACGTCTAAAATCCCACA	CTCCTTCGGGCTAGGATGAT	694	59
3	EXON2	ACTCAGCTTTGTGGGAGCAT	AGGCTCCTTTTCACCCAGAT	387	59
4	EXON2	TGCCCTTACCTCACAAAACC	AGGTTCTGCTGCCTCTTCAA	371	59
5	EXON2	CAGCCTGTGTTTCATCTCCA	AATCACACACGTTGCAGGAA	676	59
6	EXON2	CTGGCTTGTGCTATGTTGGA	CGGGGGTCACTTAATTGTTG	622	59
7	3'UTR	CCTGGAAAAGGCAGTGAGAC	ACACCACTTCTTGGGAGTGC	609	59
8	3'UTR	TCCAGGGCGATACTGTTTTTC	GGGTCCGTCAGGTAAGTCAA	571	59
9	3'UTR	CTCTCTTCTTGGCTGCTGCT	AATACTCCAGGCCACACTGC	623	59
10	3'UTR	AGCACATTGTTGGACCATGA	TTAGAACGCCTAAGGCAAGG	536	59
11	3'UTR	ACGTTCTTCACAAGGGGGTA	CCAAGACTTTGCCTTCCAAA	482	59
12	3'UTR	CCAGGGACTCAAATTCCAA	CAGCAAGACCAGTCCCCTAC	538	59
13	3'UTR	CAGAGCCTGCCCTTACTCAC	CTGGTAACTGACCCCTCAGC	505	59
14	3'UTR	GCCTCTCCTTTCACATTCCA	CCATGTCCTTGTGGCCTACT	496	59
15	3'UTR	CCAGGATTCCTTCCAAGTCA	TTGCCAGTTCAGCAACAGTC	511	59
16	3'UTR	AACATGGGGGTAGAGTGGTG	TGTGGTCACCTCACCAGAAA	464	59
17	3'UTR	CCCTCATCCTCATGGTCACT	CCAGTGTCTCCATCACAGA	592	59
18	3'UTR	TCCCAAAGTGCTGGGATTAC	CTACAAATTGCCTGGGGAAA	568	59
19	3'UTR	GACTTACAGATCCCCCGACA	CAGAGCAGGGGAAGTCACAT	557	59

20	3'UTR	AGTGAGGCATGGAGGTGTTT	GTTCCCAATCTGCCCTACAA	575	59
	<i>NDP</i>				
1	EXON1	AACTTCCTCGCCCTTGTTCT	GCGCTTGTTTTCTGCTTAC	431	59
2	EXON2	TGTTTTTCATTCCAGCTGTGC	CTCCATCCCCTGACAAAGAA	474	59
3	EXON3	GGCCTGGGTGTTGACTTAAA	GCTGGTCGAACTGCCTCTAC	445	59
4	EXON3	CCAGACTTCCAAGCTGAAGG	GCCTGACACGCTTGTGTATG	444	59
5	EXON3	TTGGCTCTCAATGCTGTTTG	GCCTTTTCCAGAGTCAGTGC	507	59
6	EXON3	CAGCCAGCGAACTGACATTA	AGGAGATGCTCAAGCACTAGC	579	59
	<i>TSPAN12</i>				
1	5'UTR	CTGGGTGAGAGGGACAAGAA	CCAGAGCCAGCCCTTAAGTA	491	59
2	EXON1	GGTGAGATGTCCCGTGTTCT	TCAAAGGCATTTTAAGAAGGTCA	340	59
3	EXON2	AATCCTGCAGTGAATGTTACG	AGGCGCACCTTAAGGAGAAT	314	59
4	EXON3	TGCTATGTCTTGGGTGCATT	AAACGAAAGCGTCCCTTCTT	331	59
5	EXON4	TGCCTCTGTTTTCTTGGTCA	TTCACCTTCTGCCATGATTG	367	59
6	EXON5	CGAGTATGCGTGTGTACGTG	GAAGAAAAGCAGGCCATGAA	393	59
7	EXON6	TTTGTGGTTTCTGAGGCTGA	TTTCTTCTGCTTCTCCCCATA	333	59
8	3'UTR	TGATCCCAGTTAGTCTGATTTTCAT	GGACATGACAGGTGCTGAGA	322	59
9	3'UTR	GGGGACAGACCAAATGATGT	AAACCATGCTGCCTCAAAAC	443	59
10	3'UTR	TATGTTTTGAGGCAGCATGG	GCCCAGGACAGAATAGTAAAGC	476	59
11	3'UTR	GCATCATTATTTTAGCCTTTCC	AAATGCACTTTTCCCATTTC	502	59
12	3'UTR	GCCTTCTCCAAACAAGAAGC	CATGTTTTTCTCCCCTTGACA	386	59
	<i>LRP5</i>				
1	5'UTR	CCCACTCATAGAGGCTCCAC	CCAAGTCGCTTCCGAGAC	612	59

2	EXON2	CATCCCAGGGCTGTGTATCT	ACTTGGGCTCATGCAAATTC	543	59
3	EXON3	GGGCAAGTTCACTGTCTGTTG	AAGAAGGAACGCCTTCAAAA	369	59
4	EXON4	TAATTGGGTCAGCAGCAATG	TGCAGCAGGTACCCCTTTAG	457	59
5	EXON5	AGTGACGGTCCTCTTCTGGA	CAAGTGGATCATTTCGAACG	302	59
6	EXON6	TGGCTGAGTATTTCCCTTGC	CCAGAATGACAGGTCCAGGT	577	59
7	EXON7	GATGCTGCAGAGACCAGACA	ATGTGGCCAAATAGCAGAGC	344	59
8	EXON8	GCATTGAACCCGTCTTGTTT	ACCCGTCACTTCCTCCTCAT	392	59
9	EXON9	TGCTGGGCTGTTGATGTTA	CTTTGAGGCAGGAACAGAGG	407	59
10	EXON10	AGCGAAACTCCGTCTCAAAA	GGACAGGCCAAACACTTACCC	324	59
11	EXON11	GCGGTGAGAGCAGACTCACT	ACTTGCAGGCCACAGGGTAT	332	59
12	EXON12	CAAGGTGGCCAAACACTTTA	CCCAGAACCAGCCTGATCTA	520	59
13	EXON13	CCAGCTCCTCTGTGGCTTAC	TCCTCCCTCTGCTAAGGACA	352	59
14	EXON14	CAGTGCTCAGGAGTCTTGGTT	CTGTGAGAGGCTGGCATTTC	326	59
15	EXON15	CTGAGAGGCAGGGGCTTT	CAGGTCTCGGACAATGTGG	382	59
16	EXON16	TCTGTCCTCCCAAGCTGAGT	CACACAGGATCTTGCACTGG	374	59
17	EXON17	GTTCTCATTTGGCCCCTACC	GCCACAGGGACTGTGATTTT	316	59
18	EXON18	CTTCTGCTTTGAAGCCCAGT	CAGAGCCCCTACTCCTGTGA	420	59
19	EXON19	GAAAGGGTCCCATCTGTCTG	CGTCTCCTCCCCTAAACTCC	304	59
20	EXON20	ATGTTGGCCACCTCTTTCTG	CTGCCTCCTCCAGATCATTTC	310	59
21	EXON21	TAGTGGGAGCAGAGGAGAGC	AGAAAGCAAGCATGCCTCAG	361	59
22	EXON22	AGCCCTCTCTGCAAGGAAAG	GCCCACTAGCACCCAGAATA	305	59
23	EXON23	TACCGAATCCCCTCCTCTG	CGGGGACACACAACCTCAAAT	549	59