Table 1. List of oligos.

	Forward	Reverse
Actin	5′-GGCACCACACCTTCTACAATG-3′	5′-GTGGTGGTGAAGCTGTAG-3′
Terf1	5′-TCTAAGGATAGGCCAGATGCCA-3′	5′-CTGAAATCTGATGGAGCACGT-3′
Myc	5′-GTGCTGCATGAGGAGACACC-3′	5′-AGGGGTTTGCCTCTTCTCC-3′
Lama1	5′-CTGTCACCCTGGACTTACGG-3′	5′-GGTTTGAACTTGACGCCATC-3′
Id1	5′-CTGAACGGCGAGATCAGTG-3′	5′-GCCTCAGCGACACAAGATG-3′
Olig2	5′-CAGCGAGCACCTCAAATCTA-3′	5′-CCCCAGGGATGATCTAAGC-3′
Foxd3	5′-CTTTCTTTCGGGGGACACTC-3′	5′-CCAGGAGCGAGCAGAGAG-3′
Zfp423	5′-TGACGTTCGAGAACGAGAGAG-3′	5′-GGGAGTCGAACATCTGGTTG-3′
Pou2f3	5′-ATCGACGCCAAAAGGAGAAG-3′	5′-TGGACAGGAGGGACTGAGAG-3′
Sgk1	5′-AGAGGAGTCCTGTTCCTGGG-3′	5′-GGTCAGGATGTTGGCATGAT-3′
Igf2	5′-GCTTGTTGACACGCTTCAGTT-3′	5′-AAGCAGCACTCTTCCACGAT-3′
Bmp4	5′-CGCTTCTGCAGGAACCAA-3′	5′-ATCAAACTAGCATGGCTCGC-3′
Hoxc12	5′-ACCCTGGCTCTCTGGTTTC-3′	5′-CAACTTCGAATACGGCTTGC-3′
Jak3	5′-TTGGGGACTACTTGGCTGAG-3′	5′-AGAAGTCCTCAGTGGCCAGA-3′
Gbx2	5′-CTCGCTGCTCGCTTTCTCT-3′	5′-GGGTCATCTTCCACCTTTGA-3′
Myd88	5′-TATACTGAAGGAGCTGAAGTCGC-3′	5′-ACACTGCTTTCCACTCTGGC-3′
Khdc3	5′-GAATGCCTGGAAGATCCAAA-3′	5′-ATGTGGGATGTGCTCTCCAT-3′
Rbm47	5′-AAAGAACCAGGACCAATCGC-3′	5′-CACTGTTGGATCGCTGTTCA-3′
Zfp345	5′-TGGTCTTCCCAAACATAGCC-3′	5′-ACTTCACGTGGGAAGAGTGG-3′
Dnmt3b	5′-TCTAATGCCAAAGCTCACCC-3′	5′-CTCTTTGCCTCTCCAAGCTG-3′
Gata2	5′-CACCCCTAAGCAGAGAAGCA-3′	5′-CAGGCATTGCACAGGTAGTG-3′
Fzd5	5′-AGCAGGATCCTCCGAGAGTT-3′	5′-CAGCACTCAGTTCCACACCA-3′
Spry2	5′-GATTCAAGGGAGAGGGGTTG-3′	5′-CTCCATCAGGTCTTGGCAGT-3′
Zscan10	5′-GACGGAGAGGAGGTGGTACA-3′	5′-GCCAAGCTCTCTTCTCTGAGG-3′
Fgf17	5′-ATTGATTCTCTGCTGTCAAACACA-3′	5′-GCTGGTATTCACGGATTTGC-3′
Sall4	5′-TGCCTCGGTGTTAGATGTCA-3′	5′-GACAAAGGTGGGCTGTGCT-3′
Klf5	5′-GGATCTGGAGAAGCGACGTA-3′	5′-TCCTCAGGTGAGCTTTTAAGTGA-3′
Nr5a2	5′-TGGGAAGGAAGGGACAATCT-3′	5′-AACGCGACTTCTGTGTGTGA-3′
Tbx3	5′-CATCGCCGTTACTGCCTATC-3′	5′-GCCAGTGTCTCGAAAACCC-3′
Spp1	5′-TGACCCATCTCAGAAGCAGA-3′	5′-CATTGGAATTGCTTGGAAGAG-3′
Smad7	5′-CGAATTATCTGGCCCCTGG-3′	5′-GACACAGTAGAGCCTCCCCA-3′
Zbtb43	5′-GGTAGGCTGGAGCTACGGG-3′	5′-TGGCCATCAAAGAGCAGTC-3′
Adm	5′-CATCCAGCAGCTACCCTACG-3′	5′-TTCGCTCTGATTGCTGGCTT-3′
Cxcl12	5′-CACTCCAAACTGTGCCCTTC-3′	5′-AATTTCGGGTCAATGCACAC-3′
Bend6	5′-AGAAGCATCCGGAAGGAAAA-3′	5′-TGCCATTCCAACCAGTTCTT-3′
Fndc5	5′-GGTGCTGATCATTGTTGTGGT-3′	5′-CCTTGTTGTTATTGGGCTCG-3′
Fzd1	5′-GCTTACTCCTCAGCAGCACA-3′	5′-TCTCTCACCCATCCGTCAGT-3′
Fzd2	5′-CCTCAAGGTGCCGTCCTATC-3′	5′-GGATCCAGAGACGGGCAAAA-3′
Jun	5′-ACCGAGAATTCCGTGACGAC-3′	5′-TGAAAAGTCGCGGTCACTCA-3′
Proser2	5′-ACTTGAGCAGAGGTGGCAGT-3′	5′-GTGCTTCAGGCTCTCGTCAT-3′
Lgi2	5′-CCAAGGAGTCCATCATCTGC-3′	5′-CATTCGGTCCTTGATTTCCA-3′
Bmp7	5′-CCTGGGCTTACAGCTCTCTG-3′	5′-CCATGAAGGGTTGCTTGTTC-3′
Pitx2	5′-CAAAAAGGTCGAGTTCACGG-3′	5′-CTTTCCTTGCTGGCCCTTAT-3′
Foxa1	5′-AACAGCTACTACGCGGACAC-3′	5′-GCTCGTGGTCATGGTGTTCA-3′

Table 1 continued on next page

Table 1 continued

	Forward	Reverse
Otx2	5′-CTCCTGGAGGAGAGAGCAGTC-3′	5′-GGGTCCTTGGTGGGTAGATT-3′
Nkd2	5′-GGTGTGGAACATCGCTCAC-3′	5′-CTAGGGAACCCTTGTCGTCC-3′
Col2a1	5′-GCGGTCCTACGGTGTCAG-3′	5′-TTTATACCTCTGCCCATTCTGC-3′
Ppp2r2c	5′-GCCATCACTGATCGGAGC-3′	5′-AGACGAAGAGGTTGCAGTGG-3′
App	5′-CTCTACAATGTCCCTGCGGT-3′	5′-AGCTGATTCTGGGCTCACTG-3′
Satb1	5′-TATGAACCAGAGTTCGTTGGC-3′	5′-TTTGCTGCTGAGACATTTGC-3′
Nfix	5′-TCTGGCTTACTTTGTCCACACTC-3′	5′-GTTGGGCAGTGGTTTGATGT-3′
Foxn4	5′-ACCACTGCTCTCCACAGGAA-3′	5′-CAGGACAGCGACTGAAGGTC-3′
Trpv4	5′-ACCACCCCAGTGACAACAAG-3′	5′-ATGGGCCGATTGAAGACTTT-3′
Hspa1a	5′-TTTGTGTATTGCACGTGGGC-3′	5′-GGGGCAGTGCTGAATTGAAG-3′
Prkar2b	5′-AGGCTTGCAAAGACATCCTG-3′	5′-TGTTCCCCTTCTTTGACCAAT-3′
Lef1	5′-ACCCGTACATGTCAAATGGG-3′	5′-GTCGCTGTAGGTGATGAGGG-3′

CHIRT	Forward	Reverse
Chr18	5′-CAGCCTTTGTCCTTCACAGTT-3′	5′-GGTTCATAAGGCTTTTCTCCA-3′
ChrX	5′-TGTTCCCTCACAGCACAGAG-3′	5′-TAAGCCAGCCTCTCCAAAGA-3′
Pros1	5′-GGCAGTCTCTGGAGTTGGAA-3′	5′-CTAGCATCCCTTCCCCATTC-3′
Ddx58	5′-AAGTGGGGTTTCAGAGAGCA-3′	5′-CCCTAACCCTTCCCCATAAA-3′
Arid5b	5′-CTCTTCCCCTGGAGATCCTT-3′	5′-TTGGAAACAGATTTGAGCATTC-3′
Syde2	5′-GCTGGGTTTACCCCAATACA-3′	5′-GACCCACTTCCTAAGGACAGAA-3′
Zdbf2	5′-CATGGGGAAAGCATAATTGC-3′	5′-AGGCTTGGGACTCCTCTTGT-3′
Olig2	5′-CCACACCCTGTGTGTCTGTC-3′	5′-TCAACCTTCCGAACTTGAGG-3′
Lrrc8c	5′-GCTAGGTTCTGGGGACTGG-3′	5′-CAACCGCGTTTTCTCCTAGT-3′
Sorl1	5′-GCCTACCTCAGAATGGAGGTC-3′	5′-CACACACACACACTACCATATAATCC-3′
Mpdz	5′-GCGTCCCATCTTAAAACCAA-3′	5′-GATCCTCTCCATCCCTACCC-3′
Prmt8	5′-GGTTTGGGACTTAGGGGAAC-3′	5′-AGTTCCTTTCCCCCTTGAAA-3′
Dleu7	5′-TCAAGACTGGACCCCAAAAC-3′	5′-GGACCAGCCAGCTTGTATGT-3′
Dcc	5′-TTCAGTCCCTGGACAGACAG-3′	5′-ACACGCCTTTCCTTCACAGT-3′
Control region	5′-CAATGCCTAGATATACCGATCTCTT-3′	5′-CTCAGGACAAGACCCCACTG-3′

DOI: https://doi.org/10.7554/eLife.44656.022

and GSK3 inhibitor CHR99021 (3 µM). Next day, the cells were washed with PBS twice and incubated in cytobuffer (100 mM NaCl, 300 mM sucrose, 3 mM $MgCl_2$, 10 mM pipes (pH 6.8)) for 30 s, incubated in cytobuffer with 0.5% Triton X-100 for 30 s, incubated in cytobuffer for 30 s, and fixed for 10 min in 4% paraformaldehyde in PBS. Fixed cells were dehydrated in 70% ethanol three times, once in 80%, 95%, and 100% ethanol, air-dried, and hybridized overnight at 37˚C with a telomere-specific PNA-FITC probe (Panagene) in hybridization buffer (2 × sodium saline citrate (SSC)/50% formamide). Next day, cells were washed twice for 15 min in 2 x SSC, 50% formamide at 40˚C, twice for 10 min in 2 × SSC at 40˚C, for 10 min in 1 x SSC at 40˚C, for 5 min in 4 x SSC at room temperature and for 5 min in 4 x SSC containing 0.1% Tween-20. The cells were incubated with DAPI (Molecular Probes) at room temperature for 10 min and washed three times with PBS. Fluorescence signal was preserved in Vectashild (Vector laboratories). Signals were visualized in a confocal ultra spectral microscope SP5-WLL (Leica). Statistical analyses were performed using Student's t-test, where n indicates the number of cells of each sample analyzed.