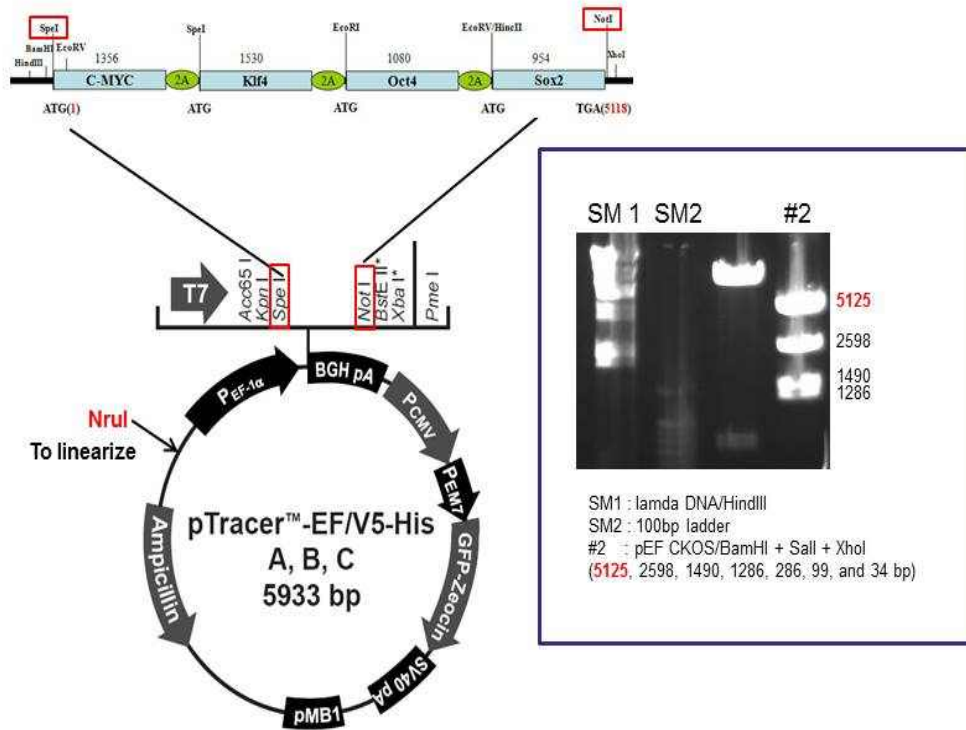


1 (A)



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3 (B): CDS 5082 nts

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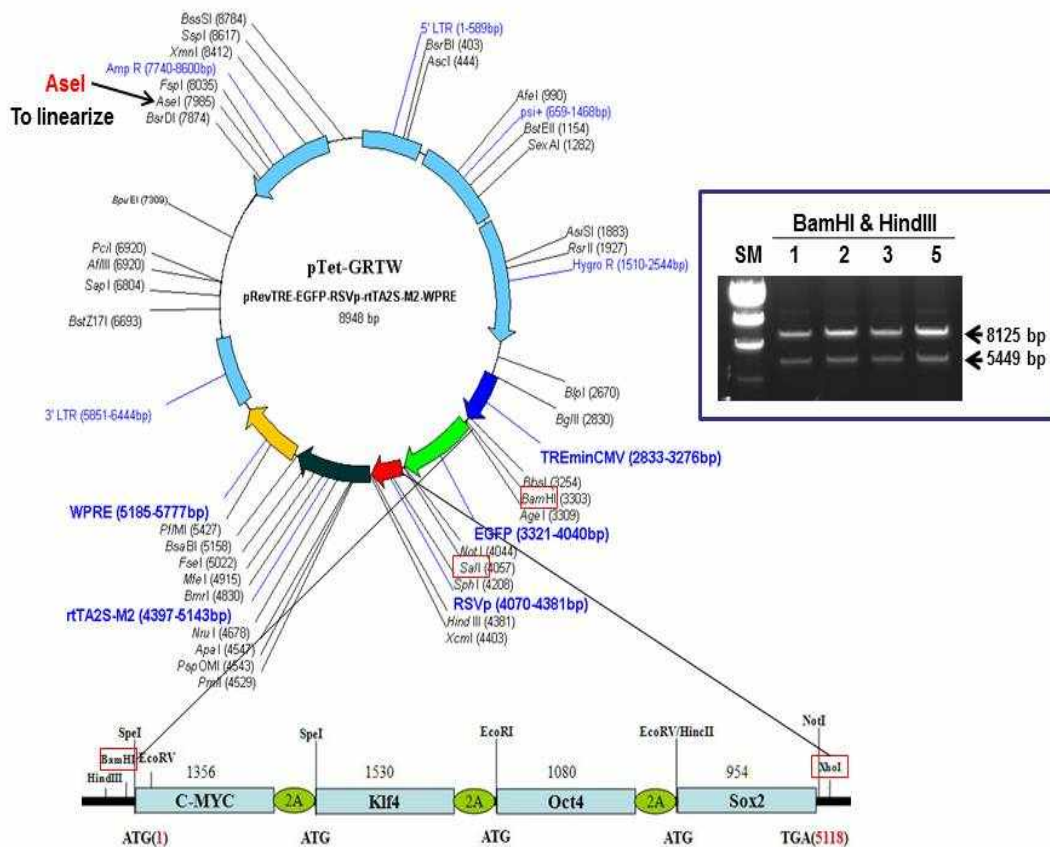
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11 AACATGATGGAGACGGAGCTGAAGCCGCCCGGCCGCAGCAAACCTTCAGGGGGCGGCGGCG  
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24 AGGCCGGGGACCTACGGGACATGATCAGCATGTACCTCCCCGGCGCTGAGGTGCCAGAGCC  
25 CGCCGCCCCAGCAGACTTCACATGTCCCAGCACTACCAGAGCGGCCCGGTGCCCGGCACG

1 GCCATCAACGGTACACTGCCTCTCTCTCACATG  
2 **CGA** CATATGGGGAATC GAATTC CC **gcggccgc**TCGAG  
3  
4 (C) CKOS; 1694aa  
5 MPLNVSFTNRNYDLDYDSVQPYFYCDEEENFYQQQQSELQPPAPSEDIWKKFELLPTPPLSPSR  
6 RSGLCSPSYVAVASFSRGGDDGGGGSFSTADQLEMVTELLGGDMVNQSFICDPDDETFIKNIIIQ  
7 DCMWSGFSAAAKLVSEKLASYQAARKDSGSPIPARGHGGYSTSSLYLQDLSAAASECIDPSVVFP  
8 YPLNDSSSPKPCASPDSTAFSPSSDLLSSAESSPRASPEPLALHEETPPTSSDSEEEQEDEEEIDVV  
9 SVEKRQPPAKRSESGSPSAGGHSKPPHSPLVLKRCHVSTHQHNYAAPSTRKDYPYSAKRAKLDSG  
10 RVLKQISNNRKCASPRSSDTEENDKRRTHNVLERQRRNELKRSFFALRDQIPELENNEKAPKVVI  
11 LKKATAYILSVQAEQKLVSEKDVLKRREQLKLEQLRNSCPRAEGRGSLTTCGDVEENPGP  
12 TSMVSDALLPSFSTFASGPAGREKTLRPAGAPNNRWREELSHMKQRLPPVLPGRPYDLAAATV  
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15 PELDPVYIPPQQSQPPGGGLMGKFLKASLSAPGSEYGSPSVISVSKGSPDGSHPVVVAPYSGGPP  
16 RMC PKIKQEAVSSCTVGRPLEAHLGTGPPLSNGHRPPAHDFPLGRQLPSRTTPTLGAEELSSRDC  
17 HPALPLPPGFHPHHGPNYPPFLPDQLQPVPPLHYQGQSRGIVVGAGEPCICRPSGAHGMVLTPPS  
18 SPLELMPPGSCMPEEPKPKRGRRSWPRKRTATHTCDYAGCGKTYTKSSHLKAHLRTHTGEKPYH  
19 CDWDGCGWKFARSDELTRHYRKHTGHRPFQCQKCDRAFSRSDHLALHMKRHFRAEGRGSLT  
20 CGDVEENPGPEFMAGHLASDFAFSPPPGGGGDGPGGPEPGWVDPRTWLSFQPPGGSGIGPGVG  
21 PGAEVWGLPACPPPYDFCGGMAYCAPQVGVGLVPQGGLETPQPEGEAGAGVESNSEGASPEPC  
22 AAPAGAAKLDKEKLEPNPEESQDIKALQKDLEQFAKLLKQKRITLGYTQADVGLTLGVLFKVF  
23 SQTICRFEALQLSFKNMCKLRPLLQKWVEEADNNENLQEICKAETLVQARKKRKRTSIENRVRG  
24 NLESMFLQCPKPTLQQISHIAQQLGLEKDVVVRVWFCNRRQKGRSSSDYSQREDFEAAGSPFPG  
25 GPVSFPLAPGPHFGTPGYGGPHFTTLYSSVPFPEGEAFPSVSVTPLGSPMHSNRAEGRGSLTTCGD

1 VEENPGPDDMYNMMETELKPPGPQQTSGGGGGGGNSTAAAAGGNQKNSPDRVKRPMNAFMV  
 2 WSRGQRRKMAQENPKMHNSEISKRLGAEWKLLSETEKRPFIDEAKRLRALHMKEHPDYKYRPR  
 3 RKTKTLMKKDKYTLPGLLAPGGNSMASGVGVGAGLGAGVNQRMDSYAHMNGWSNGSYSM  
 4 MQDQLGYPQHPGLNAHSAAQMMPMHRVDVSALQYNSMTSSQTYMNGSPTYSMSYSQQGTPG  
 5 MALGSMGSVVKSEASSPVPVTSSSHSRAPCQAGDLRDMISMYLPGAEVPEPAAPSRLHMSQHY  
 6 QSGPVPGTAINGTLP LSHM  
 7 (D)



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1 **Supplementary Fig. 1. Information on the pCKOS plasmid used for the production of transgenic**  
2 **mice.** The retrovirus vector was designed to express the four stemness factors by tetracyclin-mediated  
3 induction. For details, see Materials and Methods. (A) Construction of a pTracer-EF/V6-His A vector  
4 (Clontech) with appropriate restriction enzymes to generate pMyc-2A, pKlf4-2A, pOct4-2A and pSox2-  
5 2A vectors. (B) cDNA sequence of 5082 bp including C-Myc-2A, Klf4-2A, Oct4-2A and Sox2-2A. (C)  
6 Amino acid sequence. (D) Construction of pTet-GRTW to generate a pTet-CKOS plasmid.

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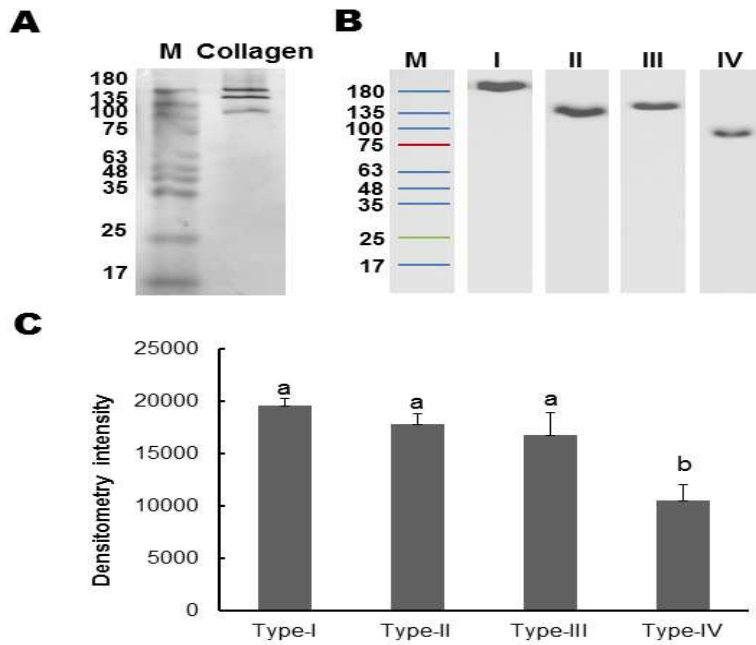
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2 **Supplemntary Fig. 2. SDS-PAGE analysis.** A) SDS-PATE analysis of 1-month-old-derived collagen  
 3 complexes on 10% gel. Lane 1 and lane 2 indicate the protein maker and collagen complexes derived  
 4 from the 1-month-old mouse tail, respectively. B) Different types of collagen contained in collagen  
 5 complexes were determined by using Western blot analysis. C\_ Relative intensities of each collagen type  
 6 from (B) and results of three independent experoments (means  $\pm$  SD; lower panel). a and b)  $p < 0.05$ .

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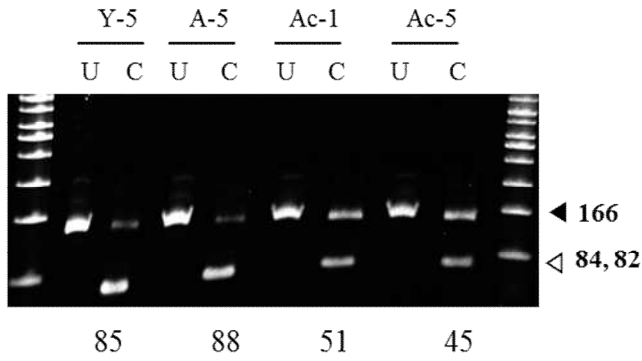
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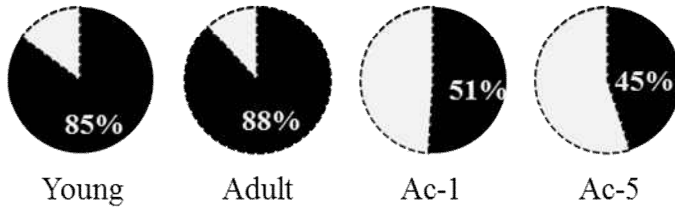
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A



B



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2 **Supplementary Fig. 3. Bisulfate restriction analysis of the PCNA gene promoter region in Y-, Ac-**

3 **and O-fibroblast cells.** A) Demethylation at the PCNA promoter gene sequence. M, DNA size marker

4 (bp); U, intact, undigested PCR products (166 bp); enzyme-treated PCR products (84 and 82 bp); Y,

5 young age-derived fibroblast; O, old age-derived fibroblast; Oc-1 and Oc-5, old age-derived fibroblast

6 cultured in the presence of collagen complexes for 1 day or 5 days. B) Validation of demethylation. The

7 percentage of methylated DNA is shown as a percentage of digested DNA (black). C) Comparison of the

8 methylation status of Oct3/4 promoter sequences. Percentage of methylation was calculated as the ration

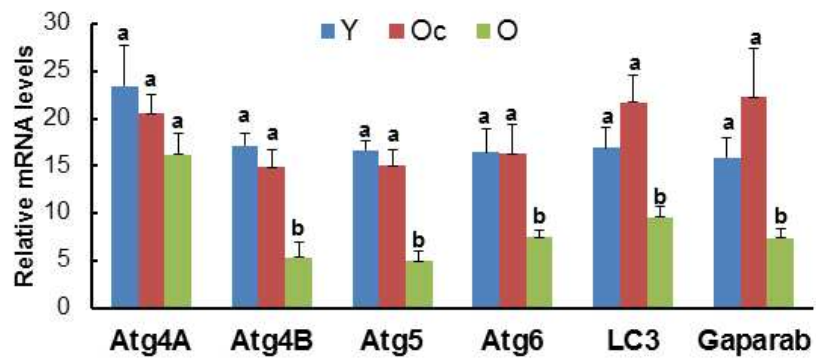
9 of converting bas Cs to Ts following bisulfite treatment.

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2 **Supplementary Fig. 4. Real-time RT-PCR analysis of autophagy-related genes.** Gene expression was

3 normalized using the GAPDH housekeeping gene. a and b)  $p < 0.05$ .