

**Supplementary Table 1.** List of Quantitative Results of Immunostaining.

Figure 1 G-I	SF1-HP	StAR	SF1-HP/StAR
YM ZT0	7.4±1.1	4.5±1.9	3.1±0.9
YM ZT12	7.5±1.5	13.22±2.1	5.6±0.5
OM ZT0	59.3±4.0	76.6±3.5	47.5±2.3
OM ZT12	61.7±1.8	77.6±3.2	49.9±2.7
Figure 2 E	p16	γH2AX	
6M	5.0±2.6	9.0±1.8	
18M	55.0±3.2	42.3±5.4	
24M	84.1±5.1	75.5±4.9	
Figure 2G	53BP1	βgal	
YM	5.0±2.5	1.8±0.76	
OM	67.7±5.2	52.0±3.3	
Figure 2 I	p16	SF1-HP	
YM ZT0	4.0±1.3	6.3±2.5	
YM ZT12	5.7±1.8	13.6±2.4	
OM ZT0	83.4±2.1	56.0±3.7	
OM ZT12	82.7±2.2	58.4±3.0	
Figure 3 G, H, J	p16	SF1-HP	StAR
Control (OM)	82.1±4.5	57.1±3.7	71.3±5.3
DQ (OM)	19.9±9.0	20.1±4.9	2.5±2.4
Figure 4 C	SF1-HP		
OM IL1β (+)	70.9±12.0		
OM IL1β (-)	72.4±15.4		

Figure 4 C	IL1 $\beta$
YM	4.6 $\pm$ 2.8
OM	50.0 $\pm$ 21.9

Figure 4 E	IL1 $\beta$
Control (OM)	47.7 $\pm$ 21.1
DQ (OM)	9.2 $\pm$ 2.8

Figure 4 I	Iba1
YM	3.8 $\pm$ 1.3
Control (OM)	4.4 $\pm$ 1.5
DQ (OM)	6.0 $\pm$ 1.6

Figure 5 E, F, G	p16	SF1-HP	StAR
YM	1.6 $\pm$ 1.6	3.8 $\pm$ 1.0	11.6 $\pm$ 2.2
$\alpha$ -IL1 $\beta$ OM	30.7 $\pm$ 2.0	9.4 $\pm$ 1.7	30.7 $\pm$ 2.0
$\alpha$ -IgG OM	63.1 $\pm$ 5.2	48.2 $\pm$ 4.6	72.0 $\pm$ 3.8
28M	75.1 $\pm$ 4.2	66.1 $\pm$ 2.6	71.5 $\pm$ 5.7

Figure 5 I, K, L	Iba1	IL1 $\beta$	SF1-HP
$\alpha$ -IL1 $\beta$ OM	5.2 $\pm$ 1.6	20.7 $\pm$ 6.0	10.4 $\pm$ 5.7
$\alpha$ -IgG OM	5.0 $\pm$ 2.0	48.7 $\pm$ 19.0	62.7 $\pm$ 2.5

Figure 5 M	SF1-HP
$\alpha$ -IL1 $\beta$ OM IL1 $\beta$ (-)	5.3 $\pm$ 1.5
$\alpha$ -IgG OM IL1 $\beta$ (-)	58.0 $\pm$ 1.0
$\alpha$ -IL1 $\beta$ OM IL1 $\beta$ (+)	17.0 $\pm$ 7.6
$\alpha$ -IgG OM IL1 $\beta$ (+)	65.7 $\pm$ 2.3

Figure 6 C, D, F	p16	$\gamma$ H2AX	Iba1
Control	10.7±1.7	0.0±0.0	3.2±1.3
Control Dex	50.6±2.6	72.1±5.0	3.8±1.8
DQ Dex	6.7±1.8	29.0±4.1	4.0±1.6
OM	75.9±5.5	81.6±2.0	3.8±1.9

Figure S4 D, E	p16	SF1-HP
6M	2.2±1.5	8.6±1.9
18M	66.6±7.2	29.3±4.7
24M	89.8±3.9	56.7±2.2

Figure S5 A	p16	$\gamma$ H2AX	$\beta$ gal
Control (OM)	46.6±4.3	72.8±9.6	39.2±9.2
DQ (OM)	8.0±2.4	8.6±1.6	1.6±2.0

Figure S5 B	p16	$\gamma$ H2AX	53BP1	$\beta$ gal
Control (OM)	83.2±3.3	65.4±18.3	67.5±2.7	68.9±15.0
DQ (OM)	26.4±5.5	28.9±4.9	22.1±1.9	23.3±4.9

Figure S6 C	$\gamma$ H2AX
YM	2.1±1.3
$\alpha$ -IL1 $\beta$ OM	74.6±1.6
$\alpha$ -IgG OM	76.6±1.6
28M	86.2±3.9

Figure S7 B, D	p16	SF1-HP	$\gamma$ H2AX	Iba1
28M Male	80.4±3.0	61.1±2.9	80.4±1.8	4.2±1.6
28M Female	54.8±3.8	17.6±1.8	39.5±2.6	10.2±1.5

Figure S8 A, B, D	p16	SF1-HP	$\gamma$ H2AX	Iba1
YM	4.1±1.0	62.2±3.3	0.6±1.0	2.2±1.5
OM	59.8±4.9	9.8±2.9	48.0±5.3	12.0±2.3

Figure S9 C, E	p16	$\gamma$ H2AX	SF1-HP	Iba1	IL1 $\beta$
YM	5.3 $\pm$ 2.3	1.4 $\pm$ 1.4	60.2 $\pm$ 4.8	2.2 $\pm$ 1.5	4.7 $\pm$ 2.5
Control (OM)	54.8 $\pm$ 3.2	50.5 $\pm$ 4.4	17.9 $\pm$ 2.6	10.2 $\pm$ 1.8	17.0 $\pm$ 3.6
DQ (OM)	20.2 $\pm$ 6.6	11.7 $\pm$ 2.0	6.6 $\pm$ 1.4	5.6 $\pm$ 2.3	6.7 $\pm$ 2.1

Figure S10 B	TUNEL
YM	0.0 $\pm$ 0.0
Control (OM)	0.0 $\pm$ 0.0
DQ (OM)	0.4 $\pm$ 0.5
E14.5	16.0 $\pm$ 2.0

Figure S10 C	Ki67
4M (YM)	19.2 $\pm$ 3.9
8M (YM)	0.6 $\pm$ 0.9
Control (OM)	0.6 $\pm$ 0.9
DQ (OM)	0.8 $\pm$ 0.8

**Supplementary Table 2** The primer sequences used in this study are listed.

primer name	Sequence (5' to 3')
mop16-Fw	CCAGGGCCGTGTGCAT
mop16-Rv	TACGTGAACGTTGCCCATCA
moSF1-Fw	AGTTGCTATTGTGCCTGGTG
moSF1-Rv	TCGTTGCCCAAATGCTTGTG
moStAR-Fw	TTGGGCATACTCAACAACCA
moStAR-Rv	TGATGACCGTGTCTTTTCCA
moCYP11A1-Fw	GCTGGAAGGTGTAGCTCAGG
moCYP11A1-Rv	CACTGGTGTGGAACATCTGG
moCYP11B1-Fw	CAGGAGCCTGACCCGATGGACA
moCYP11B1-Rv	GACTGTGGACGACCCTCTGCCA
moPer2-Fw	ACGACAATGGGAAGGAGCTG
moPer2-Rv	TGTGCTCTGCCTCTGTTCATC
moBmal-Fw	CAAGCACCTTCCTTCCAATG
moBmal-Rv	GATTGCAGTCCACACCACTG
moclock-Fw	CTCCACATGCCTCCCACTTT
moclock-Rv	ATCCCCAGGCATGAGAGTCT
moCry1-Fw	GGTTGCCTGTTTCTGACTCGT
moCry1-Rv	GACAGCCACATCCAACCTCCAG
moTBP-Fw	TCAAACCCAGAATTGTTCTCC
moTBP-Rv	GGGGTAGATGTTTTCAAATGC
moMRC1-Fw	CACACTCATCCATTACAACCAAA
moMRC1-Rv	GAGGACCACGGTGACCACT
moCD68-Fw	TCTCTAAGGCTACAGGCTGCT
moCD68-Rv	CAATGATGAGAGGCAGCAAG
moTREM2-Fw	GACTGTGGCCAAGATGCTG
moTREM2-Rv	CCTGGCTGGACTTAAGCTGT
moCSF1-Fw	AAGTGGAGGAGCCATCGAG
moCSF1-Rv	ACTGGCAGTTCACCTGTCT
moF4/80-Fw	CGTGTGTTGGTGGCACTGTGA
moF4/80-Rv	CCACATCAGTGTTCAGGAGAC
moIL1b-Fw	TGGACCTTCCAGGATGAGGACA
moIL1b-Rv	GTTTCATCTCGGAGCCTGTAGTG
moCCL2-Fw	GCTACAAGAGGATCACCAGCAG
moCCL2-Rv	GTCTGGACCCATTCCTTCTTGG
moCD11b-Fw	TACTTCGGGCAGTCTCTGAGTG
moCD11b-Rv	ATGGTTGCCTCCAGTCTCAGCA
moCX3CL1-Fw	TGCTCATCCGCTATCAGCTA
moCX3CL1-Rv	ATTTCTCCTTCGGGTCAGC
moCXCL1-Fw	TCCAGAGCTTGAAGGTGTTGCC
moCXCL1-Rv	AACCAAGGGAGCTTCAGGGTCA
moIL6-Fw	TACCACTTCACAAGTCGGAGGC
moIL6-Rv	CTGCAAGTGCATCATCGTTGTTC
moCCL5-Fw	CCTGCTGCTTTGCCTACCTCTC
moCCL5-Rv	ACACACTTGGCGGTTCCCTTCGA
moMMP3-Fw	CTCTGGAACCTGAGACATCACC
moMMP3-Rv	AGGAGTCCTGAGAGATTTGCGC
moTNF $\alpha$ -Fw	GGTGCCTATGTCTCAGCCTCTT
moTNF $\alpha$ -Rv	GCCATAGAAGTGTGAGAGGGAG
moCasapase9-Fw	AGAGGTTCTCAGACCAGAAACA
moCasapase9-Rv	CATATCTGCATGTCCCCTGA
moMicroglobulin-Fw	CCACTGAAAAAGATGAGTATGCCT
moMicroglobulin-Rv	CCAATCCAAATGCGGCATCTCA

**Supplementary Table 3** The manufacturers and conditions of use of the antibodies used in this study are summarized below.

Antibody name	Supplier (Catalog No.)	Clonality (Clone)	Reactivity	Application
Anti-CDKN2A/p16INK4a Antibody	abcam (ab211542)	Rabbit mono (EPR20418)	Mouse	IF (1:200)
Anti-mouse Nr5a1 (Ad4BP/SF1) monoclonal Antibody rat mAb	Transgenic (KO610)	mouse mono (1B1F10)	Mouse	IF (1:500) IHC (1:200)
StAR Rabbit Polyclonal antibody	Proteintech (12225-1-AP)	Rabbit poly	Human Mouse Rat Pig	IF (1:100)
Phospho-Histone H2A.X(Ser139) (20E3) Rabbit mAb	Cell Signaling Technology (#9718)	Rabbit mono (20E3)	Human Mouse Others	IF (1:500)
53BP1 antibody	Novusbio (NB100-304)	Rabbit poly	Human Mouse Others	IF (1:250)
ki67 antibody	Novusbio (NB110-89719)	Rabbit poly	Human Mouse Rat	IHC (1:100)
Iba1 antibody	GeneTex (GTX100042)	Rabbit poly	Human Mouse Rat	IHC (1:50)
IL1 $\beta$ antibody	Bioss (bs-0812R)	Rabbit poly	Human Mouse Others	IHC (1:100)
Cy3-conjugated Donkey Anti-Rat IgG (H+L)	Jackson Immuno Research (712-165-153)	-	-	IF secondary antibody (1:1000)
Alexa Fluor 647 Goat anti-rabbit IgG (H+L)	Thermo Fisher Scientific (A-21245)	-	-	IF secondary antibody (1:1000)