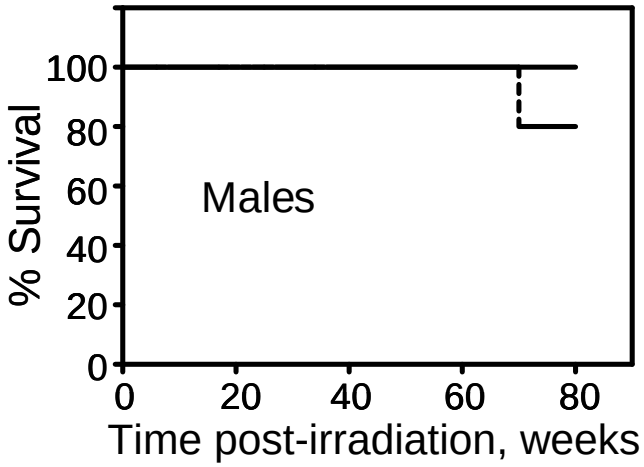
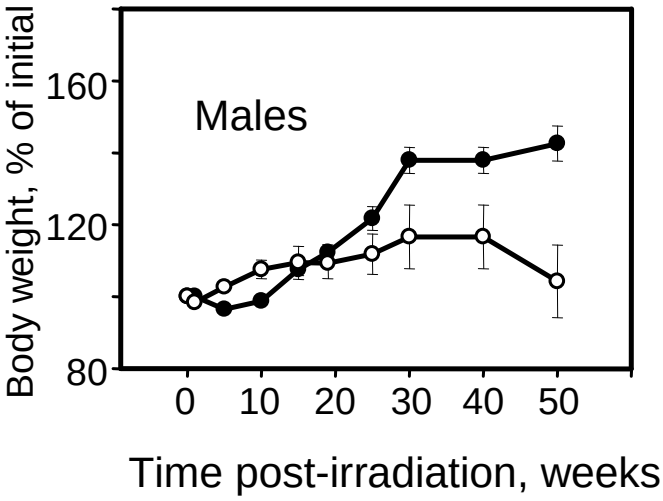
A

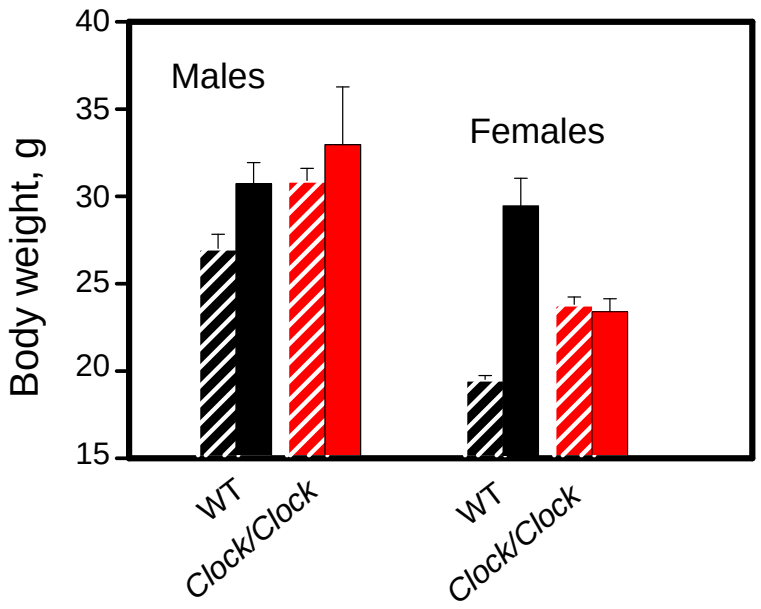


B



Supplementary Fig. 1

Survival rate and body weight loss in WT and *Clock/Clock* males after 4Gy of TBI

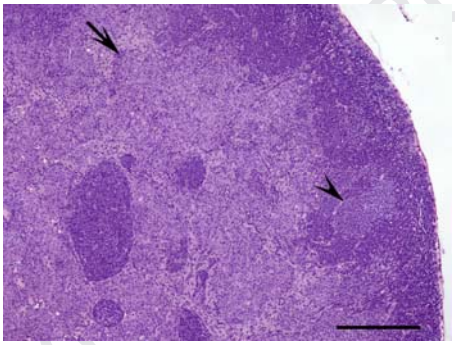


Supplementary Fig.2

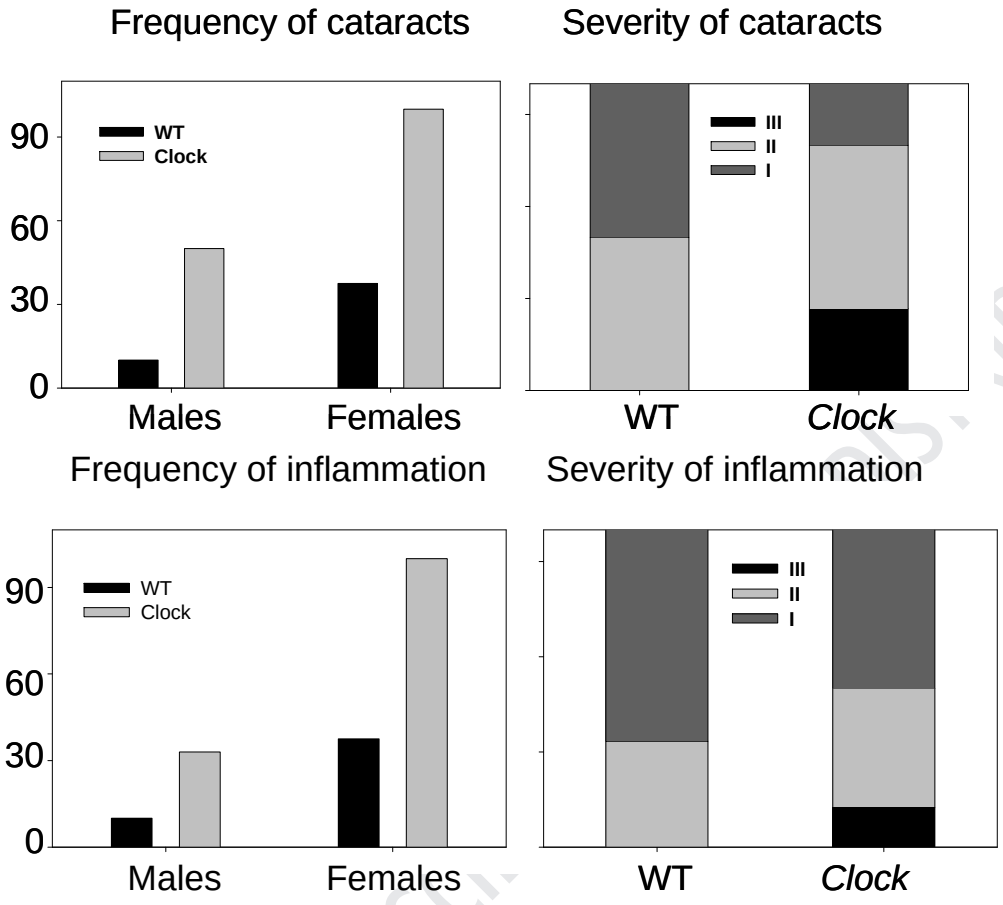
Body weight of WT and *Clock/Clock* mice after 80 weeks of TBI.
WT- black bars, *Clock/Clock* – red bars; untreated mice at 12-14 weeks of age – hatched bars; same mice 80 weeks post irradiation – closed bars.

A

B



Supplementary Fig. 3. Reactive hyperplasia of mandibular lymph nodes in *Clock/Clock* female mice. A – mandibular lymph nodes, gross appearance; an arrow indicates lymph node; B – plasmacytosis in the medullar (arrow) and secondary follicle (arrowhead) in the peripheral cortex of the lymph node. Hematoxylin and eosin, Calibration bar, 200 µm.



Supplementary Fig. 4. Frequency and severity of cataracts and eye Inflammation in WT and Clock/Clock mice after 80 weeks of TBI. The following criteria were used for grading. Cataracts: grade I – minor changes that can be detected by histological examination only; grade II – opacity can be observed by gross examination and moderate changes can be detected by histological examination; grade III – significant opacity can be observed by gross examination and major histological changes in the structure of lens. The examination had been done independently by two investigators, who had no knowledge of animal genotype and treatment before examination.

Supplementary Table 1. Whole blood cell counts (WBC) and WBC differentials in WT and *Clock/Clock* female mice after 66-68 weeks of low-dose TBI. RBC – red blood cells, WBC – white blood cells, Neut – neutrophils, Lymph – lymphocytes, Mono – monocytes, Eosin – eosinophils, Baso – basophils, LUC – large unstained cells. Blood samples were analyzed using an Advia 120 hematology system with software application for C57BL/6J mice.

	RBC, x 10^6	WBC, x 10^3	Neut, %	Lymph, %	Mono, %	Eosin, %	Baso, %	LUC, %
WT	7.0±1.2	6.4±5.9	22.5±13.5	66.7±14.5	3.3±2.4	2.8±1.4	0.7±0.3	4.1±2.2
Cl/Cl	7.2±0.9	7.8±3.0	15.0±5.6	73.2±9.0	4.25±2.7	3.6±2.3	0.5±0.4	3.5±2.8

Supplementary Table 2. Cell cycle-related genes that are up- or down-regulated in spleens of *Clock/Clock* mice

UniGene	RefSeq	Symbol	Down-regulated in *Clock/Clock*	Description
Mm.260114	NM_172301	Ccnb1	**0.77**	Cyclin B1, essential for the control of the cell cycle at the G2/M (mitosis) transition
Mm.22592	NM_007630	Ccnb2	**0.78**	Cyclin B2
Mm.307103	NM_007658	Cdc25a	**0.78**	Cell division cycle 25 homolog A (S. pombe). Tyrosine protein phosphatase which functions as a dosage-dependent inducer of mitotic progression.
Mm.42201	NM_008316	Hus1	**0.55**	Component of the 9-1-1 cell-cycle checkpoint response complex
Mm.287173	NM_009516	Wee1	**0.60**	Cell cycle regulator
			Up-regulated in *Clock/Clock*	
Mm.273049	NM_007631	Ccnd1	**1.38**	Cyclin D1
Mm.195663	NM_007669	Cdkn1a	**1.49**	Cyclin-dependent kinase inhibitor, p21, inhibitor of cell proliferation
Mm.16753	NM_007691	Chek1	**1.41**	Serine/threonine-protein kinase Chk, required for checkpoint mediated cell cycle arrest in response to DNA damage. May also negatively regulate cell cycle progression
Mm.389750	NM_007836	Gadd45a	**1.31**	Growth arrest and DNA-damage-inducible protein
Mm.1100	NM_010564	Inha	**2.20**	Inhibins/activins are involved in regulating a number of diverse functions such as hypothalamic and pituitary hormone secretion, gonadal hormone secretion, germ cell development and maturation, erythroid differentiation, insulin secretion, nerve cell survival
Mm.347749	NM_181345	Npm2	**2.45**	Nucleoplasmin-2, regulation of exit from mitosis
Mm.1237	NM_008885	Pmp22	**1.91**	Peripheral myelin protein 22, growth arrest-specific 3
Mm.235580	NM_011250	Rbl2	**1.72**	Retinoblastoma-like protein 2, key regulator of entry into cell division. May act as a tumor suppressor
Mm.20894	NM_011641	Trp63	**1.56**	Acts as a sequence specific DNA binding transcriptional activator or repressor. May be required in conjunction with TP73/p73 for initiation of TP53/p53 dependent apoptosis in response to genotoxic stress

Supplementary Table 3. Apoptosis-related genes that are up-regulated in spleens of *Clock/Clock* mice

UniGene	RefSeq	Symbol	Up-regulated in *Clock/Clock*	Description
Mm.220289	NM_009684	Apaf1	**1.54**	Apoptotic peptidase activating factor 1
Mm.2443	NM_007523	Bak1	**2.01**	BCL2-antagonist/killer 1
Mm.89961	NM_010872	Birc1b	**1.54**	Baculoviral IAP repeat-containing 1b
Mm.335659	NM_007465	Birc2	**2.03**	Baculoviral IAP repeat-containing 2
Mm.2026	NM_007464	Birc3	**1.49**	Baculoviral IAP repeat-containing 3
Mm.34405	NM_009810	Casp3	**4.52**	Caspase 3
Mm.24103	NM_029653	Dapk1	**2.04**	Death associated protein kinase 1
Mm.24163	NM_023258	Pycard	**2.35**	PYD and CARD domain containing, positive regulation of caspase activity
Mm.287450	NM_173378	Trp53bp2	**1.60**	Transformation related protein 53 binding protein 2; response to ionizing radiation, negative regulation of progression through the cell cycle
Mm.20894	NM_011641	Trp63	**2.58**	Transformation related protein 63
Mm.78015	NM_011642	Trp73	**2.41**	Transformation related protein 73