**Morc3 mutant mice exhibit reduced cortical area and thickness, accompanied by altered haematopoietic stem cells niche and bone cell differentiation**

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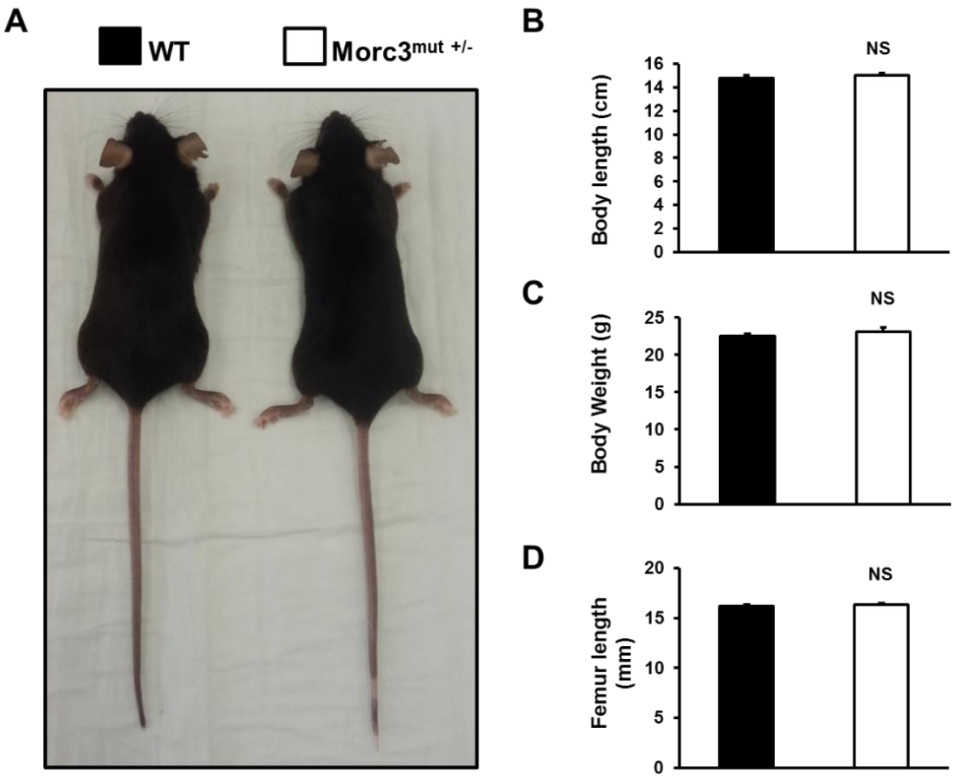
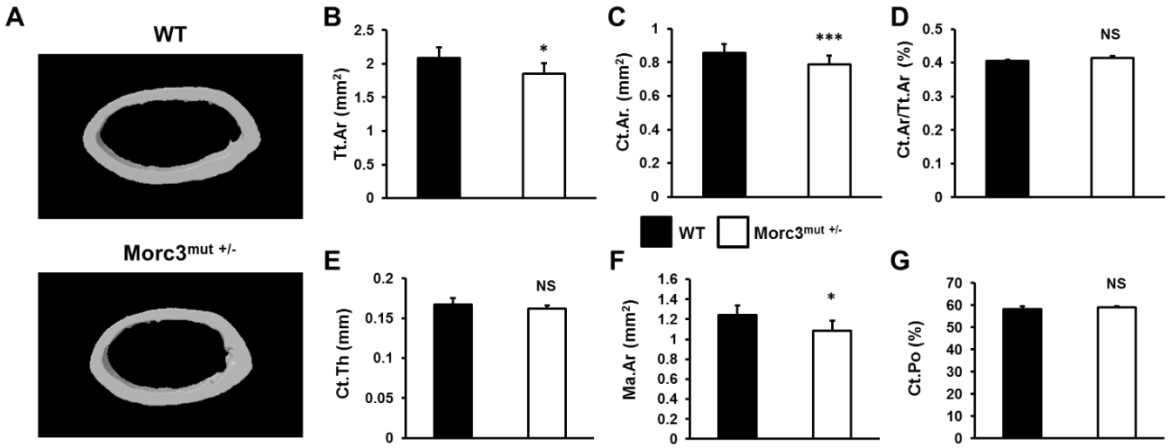
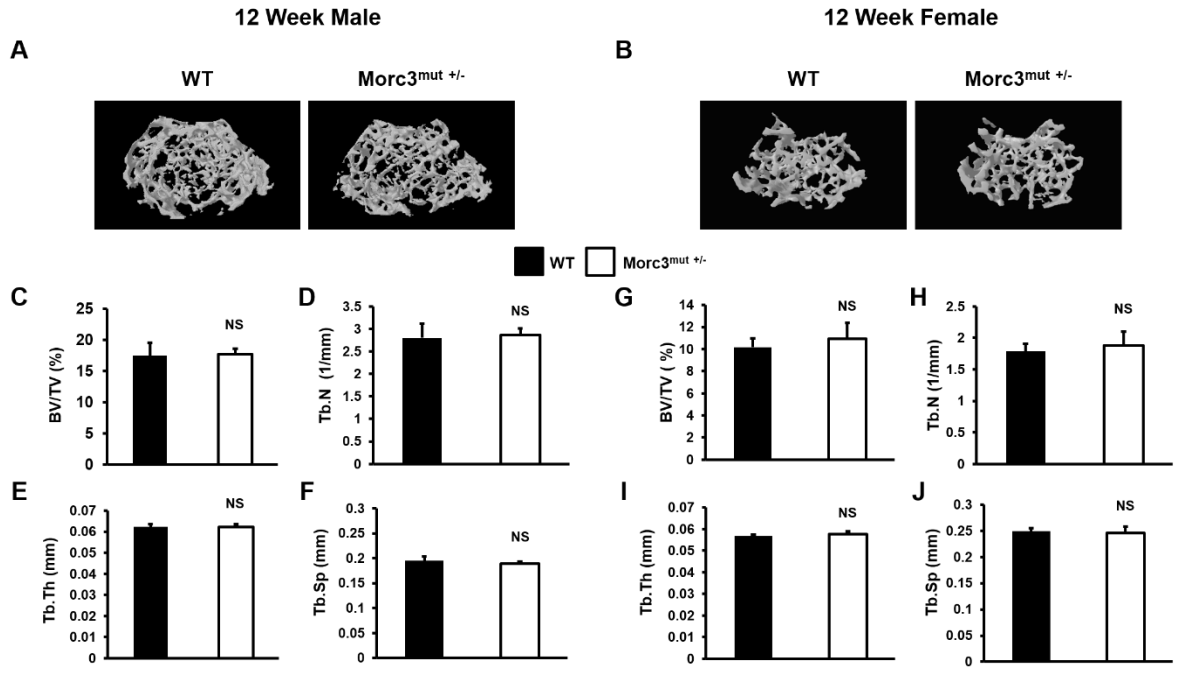
# Supplementary Information



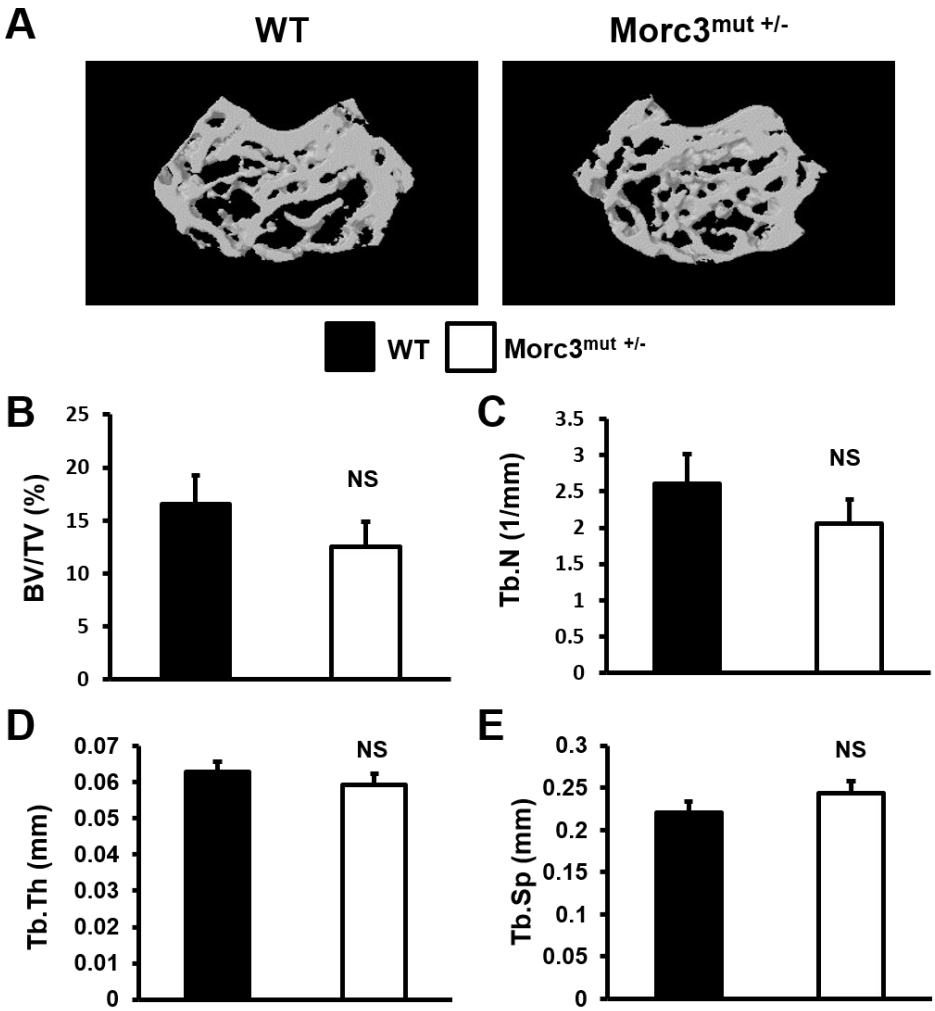

**Supplementary Figure 1. No major differences in Morc3$^{mut+/-}$ mice.** (**A**) 12 week old female WT and Morc3$^{mut+/-}$ mice. (**B**) Morc3$^{mut+/-}$ mice had similar body structure as compared to WT controls. (**C**) Body weight and (**D**) total femur length of Morc3$^{mut+/-}$ mice did not differ significantly as compared to WT controls (n=6). Data are presented as mean ± SEM. NS=non-significant



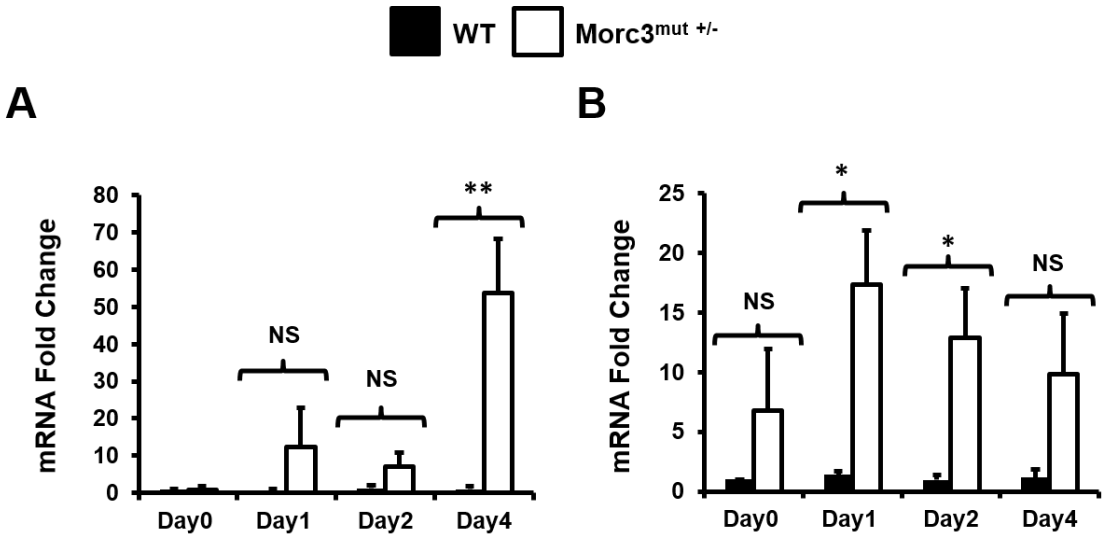

**Supplementary Figure 2: Reduced cortical bone mass in older male Morc3$^{mut+/-}$ mice.** MicroCT analysis of cortical bone from 24 week old male WT and Morc3$^{mut+/-}$ mice showed a reduction in cortical bone area and medullary area (n=5). (**A**) Representative 3D reconstructions of cortical bone in 24 week old WT and Morc3$^{mut+/-}$ mice. (**B-G**) Cortical bone parameters as assessed by microCT; (**B**) total cortical area (Tt.Ar; mm$^2$), (**C**) cortical bone area (Ct.Ar; mm$^2$), (**D**) cortical area fraction (Ct.Ar/Tt.Ar; %), (**E**) cortical thickness (Ct.Th; μm), (**F**) medullary area (Ma.Ar; mm$^2$) and (**G**) cortical porosity (Ct.Po; %). Data are presented as mean ± SEM. NS=non-significant; *P<0.05; ***P<0.001.




**Supplementary Figure 3: Morc3$^{mut+/-}$ mice have normal trabecular bone parameters.** MicroCT analysis of femurs from 12 week old male and female mutant mice revealed no difference in trabecular bone mass as compared to femurs from WT controls (n=9). (**A**,**B**) Representative 3D reconstruction of trabecular bone from male and female mice respectively. (**C-F**) and (**G-J**) Results from analysis of trabecular bone parameters; bone volume per total volume (BV/TV; %), trabecular number (Tb.N; 1/mm), trabecular thickness (Tb.Th; mm), trabecular separation (Tb.Sp; mm) in male and female mice respectively. Data are presented as mean ± SEM.NS=non-significant.




**Supplementary Figure 4: No difference in trabecular bone mass in older male Morc3$^{mut+/-}$ mice.** MicroCT analysis of femurs from 24 week old male mutant mice revealed no difference in trabecular bone mass as compared to femurs from WT controls (n=5). (**A**) Representative 3D reconstructions of trabecular bone in 24 week old WT and Morc3$^{mut+/-}$ mice. (**B**-**E**) Trabecular bone parameters as assessed by microCT; (**B**) bone volume per total volume (BV/TV; %), (**C**) trabecular number (Tb.N; 1/mm), (**D**) trabecular thickness (Tb.Th; mm) and (**E**) trabecular separation (Tb.Sp; mm). Data are presented as mean/fold change ± SEM. NS=non-significant.




**Supplementary Figure 5: Mutation in Morc3 alters IFN-β and STAT1 gene expression during RANKL-induced osteoclastogenesis.** BMMs were isolated from age-and sex-matched WT and Morc3$^{mut\ +/-}$ mice and cultured with RANKL (25ng/ml) and M-CSF for 5 days. Real Time-PCR analysis of (**A**) *Ifnb1* and (**B**) *Stat1* during osteoclast differentiation in Morc3$^{mut\ +/-}$ mice as compared to WT (n=3). *Hprt1* was used as integral housekeeping control. %). Data are presented as mean ± SEM. NS=non-significant; *P<0.05; **P<0.01.