

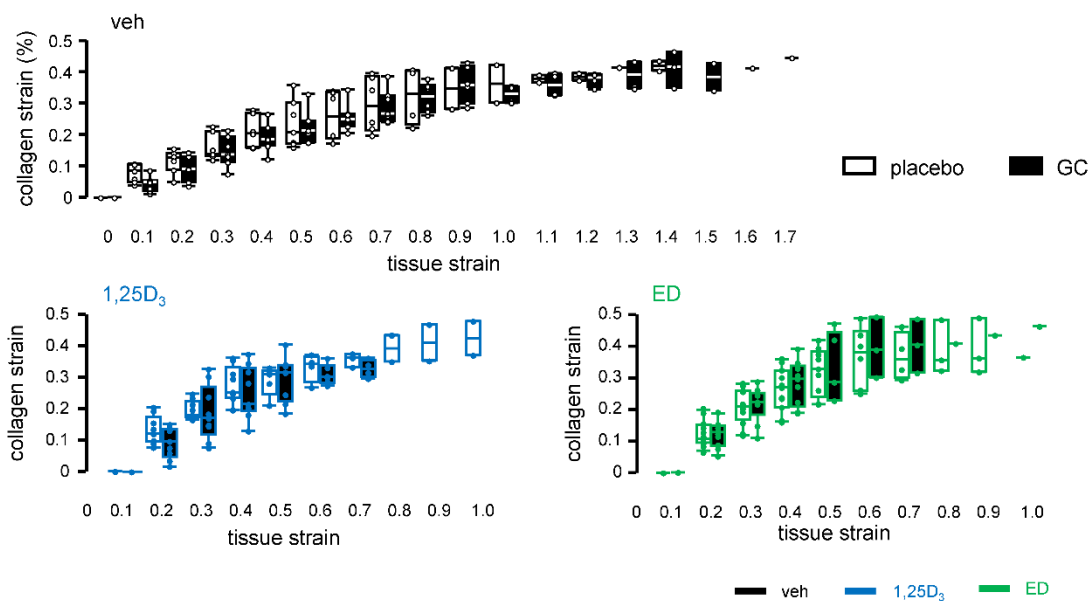
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940 **Supplemental Figure 1. GC and VDR metabolite actions upon the musculoskeletal tissues.**

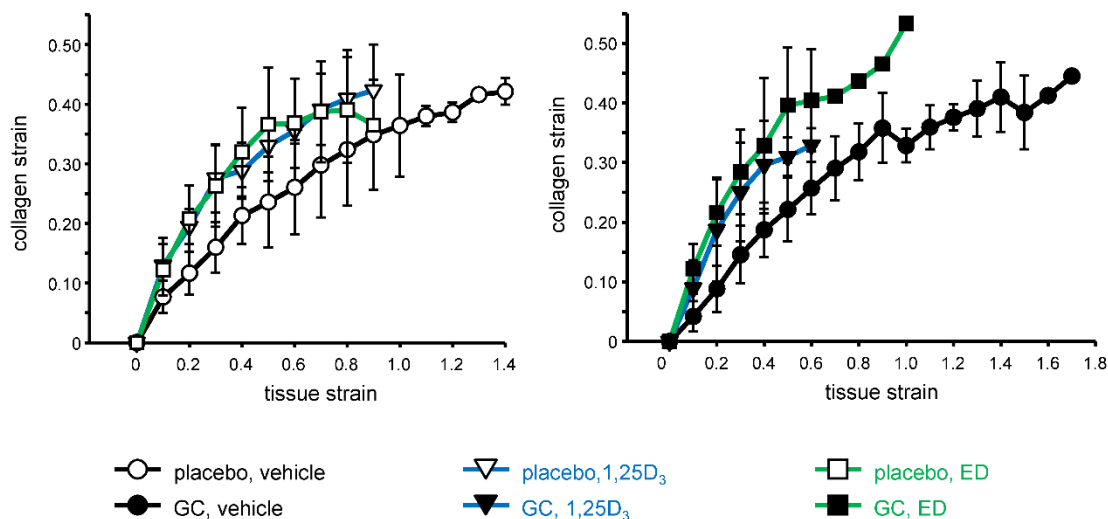
941 Mice were implanted with 2.1 mg/kg/d prednisolone or placebo slow-release pellets and gavaged  
 942 5x/wk with 50 ng/kg/d 1,25D<sub>3</sub> or ED or vehicle for 8 weeks. (A) BMD, (C) sera CTX, and isolated  
 943 (D) wet weights of the indicated hindlimb muscles. n=10-12. (B) Mineralizing apposition rate  
 944 (MAR) quantified by dynamic histomorphometry in longitudinal sections of lumbar vertebral L1-L3  
 945 cancellous bone. n=5-10 \*P<0.05 vs. corresponding placebos, #P<0.05 vs. corresponding  
 946 vehicle-treated, ^P<0.05 vs. corresponding 1,25D<sub>3</sub>-treated, by two-way ANOVA, Tukey post hoc  
 947 test. ΩP<0.05 vs. placebo and vehicle-treated controls by one-way ANOVA, Dunnett's Method  
 948 post hoc test.

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### A SAXS strain vs. strain curve analysis, dot and box plots



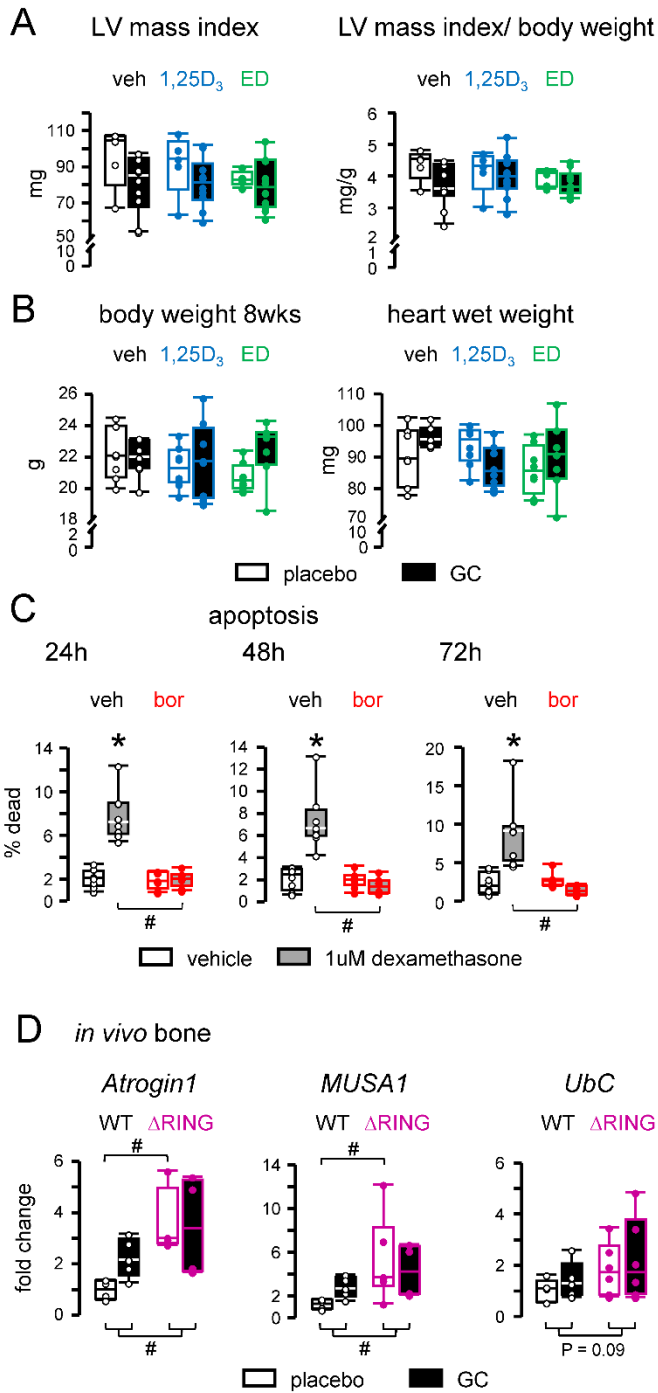
### B SAXS strain vs. strain curve analysis, averages and stdev



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952 **Supplemental Figure 2. Dot and box plot graphical representation of strain vs. strain**  
 953 **synchrotron small angle x-ray scattering (SAXS) data.** Mice were implanted with 2.1 mg/kg/d  
 954 prednisolone or placebo slow-release pellets and gavaged 5x/wk with 50 ng/kg/d 1,25D<sub>3</sub> or ED or  
 955 vehicle for 8 weeks. Tissue strain was time-matched to collagen strains (strain vs. strain curve  
 956 analysis) at yield and maximum stress for comparisons of stress-carrying components with bone  
 957 during deformation. (A) Dot and box plots indicating each individual data point and (B) line graphs

958 indicating the average and standard deviation values for findings generated by SAXS strain vs.  
959 strain curve analyses. n=7-12.  
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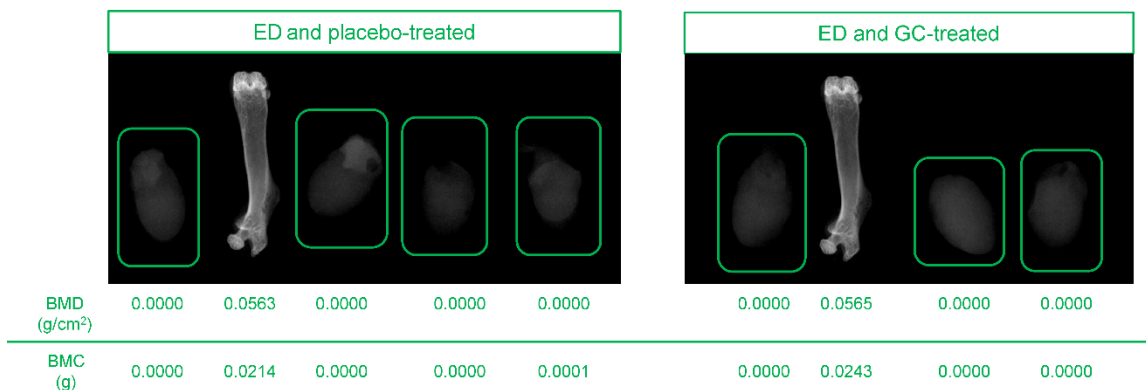
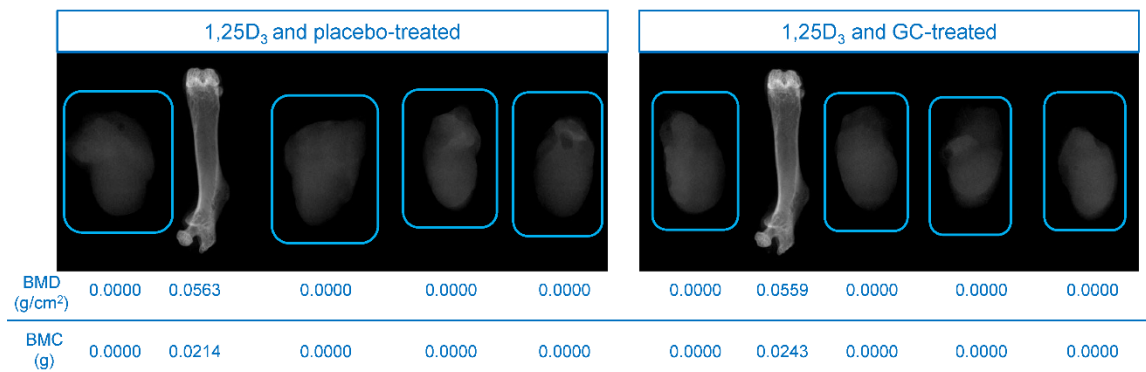
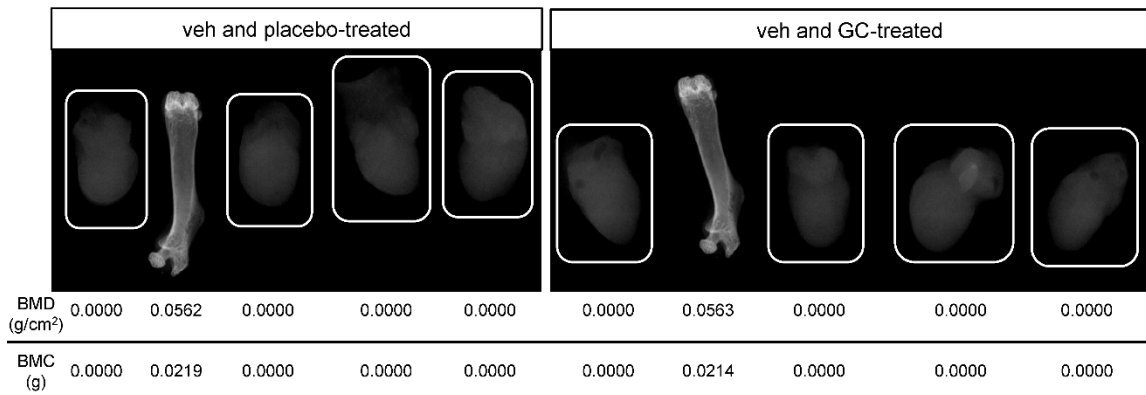


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962 **Supplemental Figure 3.** (A-B) Mice were implanted with 2.1 mg/kg/d prednisolone or placebo  
 963 slow-release pellets and gavaged 5x/wk with 50 ng/kg/d 1,25D<sub>3</sub> or ED or vehicle for 8 weeks. (A)  
 964 Left ventricular (LV) mass index absolute values and normalized by each mouse's own body weight  
 965 as assessed by ultrasound echocardiography. (B) Whole mouse body weight and heart wet weight.  
 966 \*P<0.05 vs. corresponding placebo-treated, #P<0.05 vs. corresponding vehicle-treated, ^P<0.05

967 vs. corresponding 1,25D<sub>3</sub>-treated by two-way ANOVA, Tukey post hoc test.  $\Omega P < 0.05$  vs. placebo  
968 and vehicle-treated controls by one-way ANOVA, Dunnett's Method post hoc test. (C) Cell death  
969 was quantified by Trypan Blue uptake in OB-6 cells treated with the GC dexamethasone (dex,  
970 1  $\mu$ M)  $\pm$  3nM bortezomib (Bor). n=8. \*P<0.05 vs. corresponding controls, #P<0.05 vs. corresponding  
971 vehicle-treated, by two-way ANOVA, Tukey post hoc test. (D) *Atrogin1*, *MUSA1*, and *UbC*  
972 expression was quantified by qPCR in bones isolated from the indicated treated mice. N=4-5.  
973 #P<0.05 vs. corresponding WTs, by two-way ANOVA, Tukey post hoc test.  
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whole heart DXA



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976 **Supplemental Figure 4.** BMD and bone mineral content (BMC) values of whole heart samples

977 isolated from mice treated with placebo or prednisolone and vehicle or 1,25D<sub>3</sub> or ED for 8 weeks

978 are shown, as detected by *ex vivo* DXA scanning, n=3-4.

979 **Circulating levels of calcium and phosphate**

	placebo vehicle	GC vehicle	placebo 1,25D <sub>3</sub>	GC 1,25D <sub>3</sub>	placebo ED	GC ED
<b>calcium</b> (mg/dL) <b>4wks</b>	9.02±0.43	9.25±0.40	9.39±0.48	9.75±0.55 $\Omega$	12.43±0.93 $\#^{\wedge}\Omega$	11.93±0.66 $\#^{\wedge}\Omega$
<b>calcium</b> (mg/dL) <b>8wks</b>	9.08±1.57	9.9±0.36	10.31±0.49	10.58±0.73	13.22±1.83 $\#^{\wedge}\Omega$	13.24±1.47 $\#^{\wedge}\Omega$
<b>phosphate</b> (mg/dL) <b>4wks</b>	5.7±0.97	6.67±0.83 <sup>*</sup>	5.84±1.04	6.54±1.24	5.52±0.72	5.03±0.90 $\#^{\wedge}$
<b>phosphate</b> (mg/dL) <b>8wks</b>	6.43±1.40	6.54±1.16	7.34±0.60	6.22±1.48	6.83±1.29	6.72±0.89

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981 **Supplemental Table 1.** Mice were implanted with 2.1 mg/kg/d prednisolone or placebo slow-  
982 release pellets and gavaged 5x/wk with 50 ng/kg/d 1,25D<sub>3</sub> or ED or vehicle for 8 weeks. Sera  
983 calcium and phosphate measured 4 and 8 weeks after the indicated treatments. n=10-12, \*P<0.05  
984 vs. corresponding placebo-treated, #P<0.05 vs. corresponding vehicle-treated,  $\wedge$ P<0.05 vs.  
985 corresponding 1,25D<sub>3</sub>-treated by two-way ANOVA, Tukey post hoc test.  $\Omega$ P<0.05 vs. placebo and  
986 vehicle-treated controls by one-way ANOVA, Dunnett's Method post hoc test.