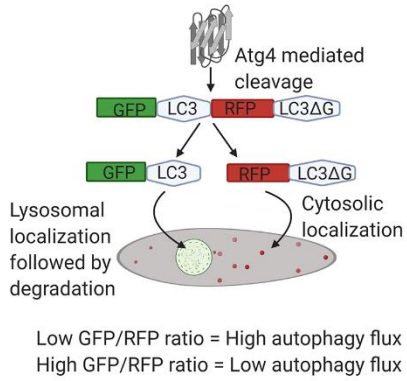


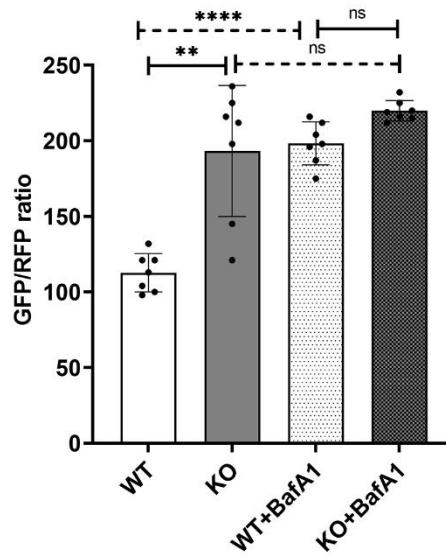
## Supplementary Figures

### Supplementary figure 1

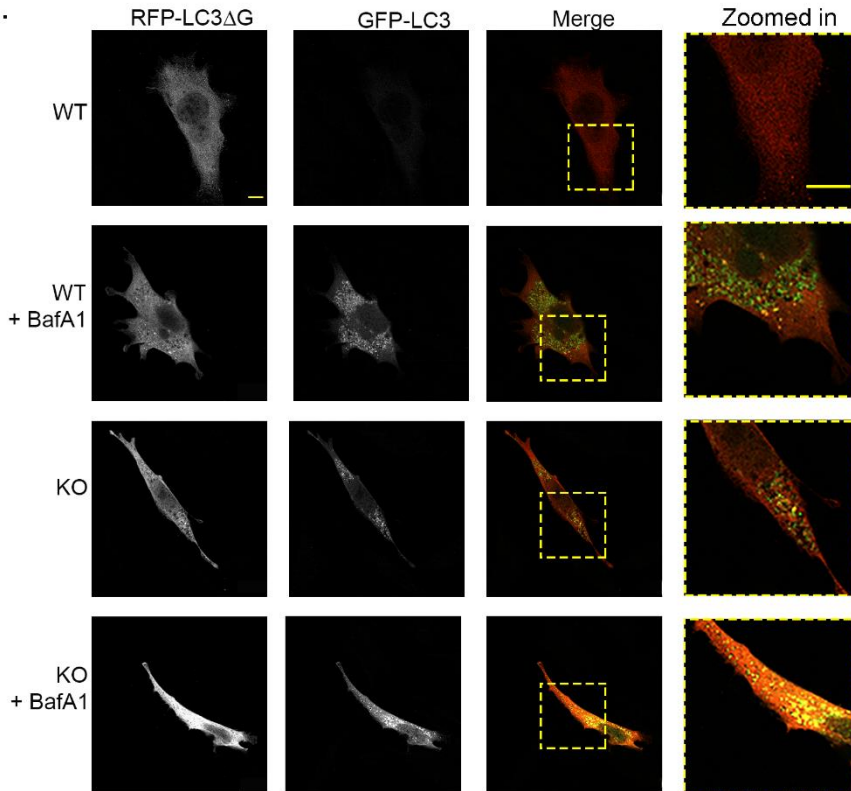
A.



B.



C.



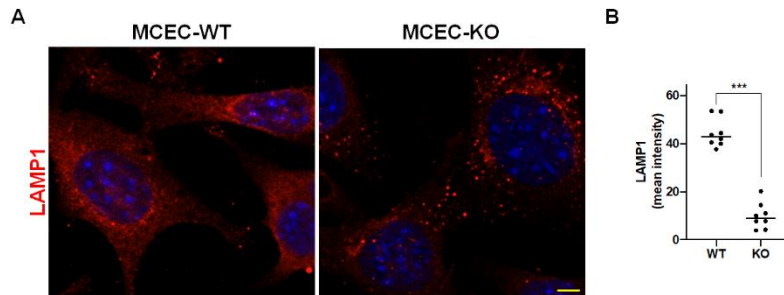
**S1A-**The mechanism of action of GFP-LC3-RFP-LC3ΔG. Once cleaved by Atg4, GFP-LC3 is degraded by lysosomal activity, whereas RFP-LC3ΔG remains in the cytoplasm. GFP/RFP ratio

can be used to measure autophagy flux. High ratio indicates low autophagy flux and vice-versa. Model adapted from (17)

**S1B-** Quantification of GFP/RFP ratio, Mean $\pm$ SD, \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , \*\*\*\* $p < 0.0001$  (One-way ANOVA with Tukey's multiple comparisons test). At least 20 cells were counted from 7 images (obtained from three independent experiments)

**S1C-** WT and KO MCEC show the expression of GFP-LC3- RFP-LC3 $\Delta$ G. Transient transfection affected the cell morphology in KO cells, however no major changes in cell shape was observed in the WT cells. Scale bar - 10  $\mu$ m

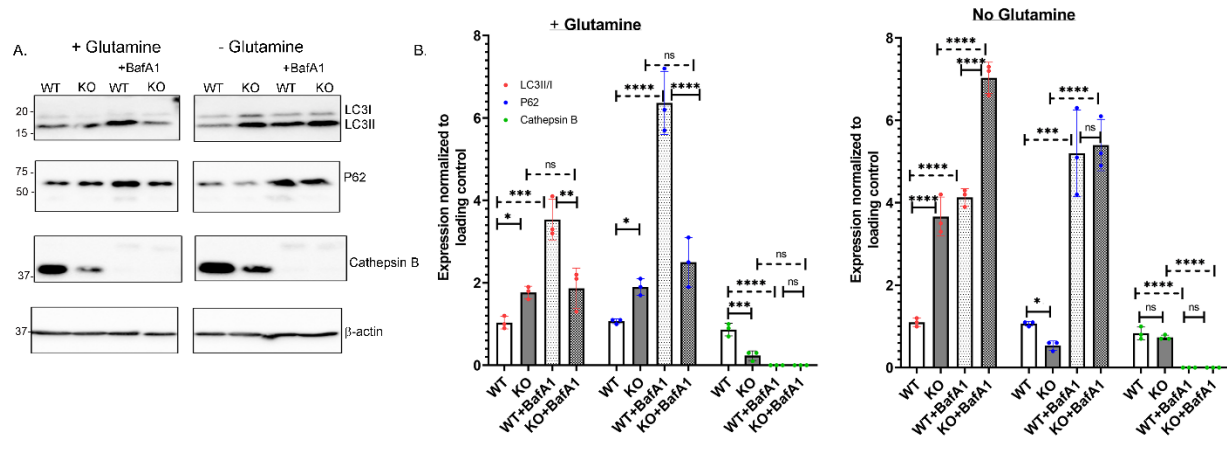
## Supplementary figure 2



**S2A-** Lamp1 staining in WT and KO MCEC cells.

**S2B-** Quantification of LAMP1 mean intensity. A minimum of 8 images per each MCEC-WT and KO cells were used for each analysis. At least 25 cells per both MCEC-WT and KO cells were analyzed. Scale bar – 5  $\mu$ m. N=9, Mean $\pm$ SD, \*\*\* p<0.001 (Student's t test).

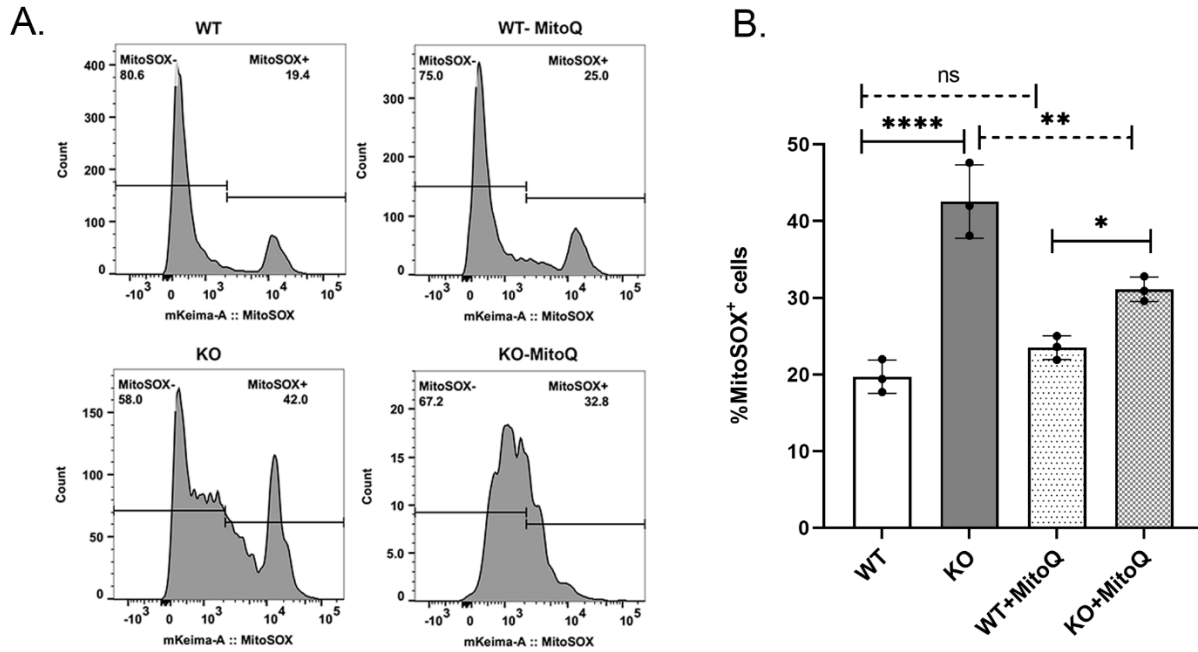
Supplementary figure 3



**S3A-** Western Blot analysis of autophagy markers, LC3 and P62 and lysosomal Cathepsin B in WT and KO cells grown in culture media with or without glutamine for 17 hours.

**S3B-** Quantification of the results from Panel A, n=3, Mean $\pm$ SD, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, \*\*\*\*p<0.0001 (One-way ANOVA with Tukey's multiple comparisons test).

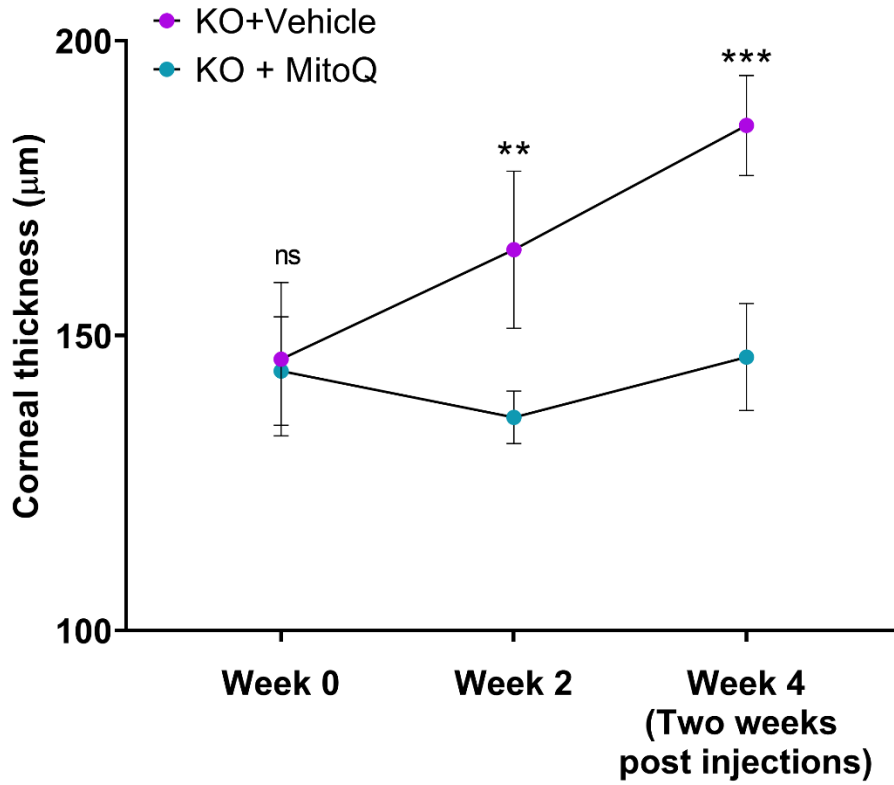
Supplementary figure - 4



**S4A-** Flow cytometry results of MitoSox (marker for mitochondrial ROS) positive cells. WT and KO MCEC treated with 2 $\mu$ M MitoQ for 17 hours.

**S4B-** Quantification of flow cytometry results from three independent samples. At least 10,000 cells were counted for each sample, Mean $\pm$ SD, \*p<0.05, \*\*p<0.01, \*\*\*\*p<0.0001 (One-way ANOVA with Tukey's multiple comparisons test).

Supplementary figure - 5



**S5** – *Slc4a11* KO animals were injected either with MitoQ or vehicle for two weeks. After this time, both sets of animals were left without any injections for another two weeks. KO animals injected with MitoQ showed decrease in corneal edema for the first two weeks but the edema returned once MitoQ treatment was stopped. \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , ns-No significance, Mean  $\pm$  SD (One-way ANOVA with Tukey's multiple comparisons test).