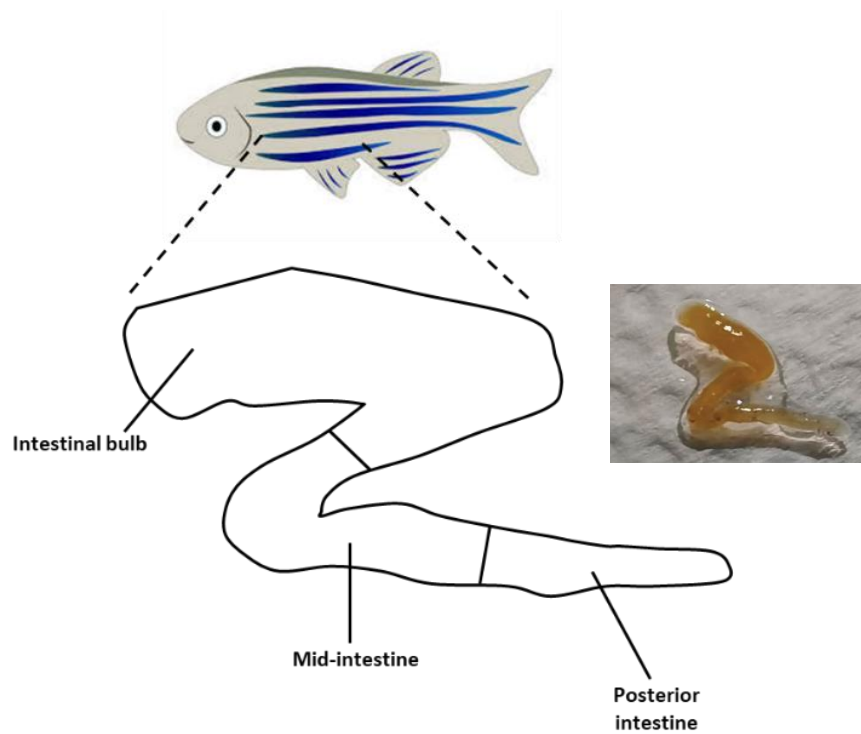
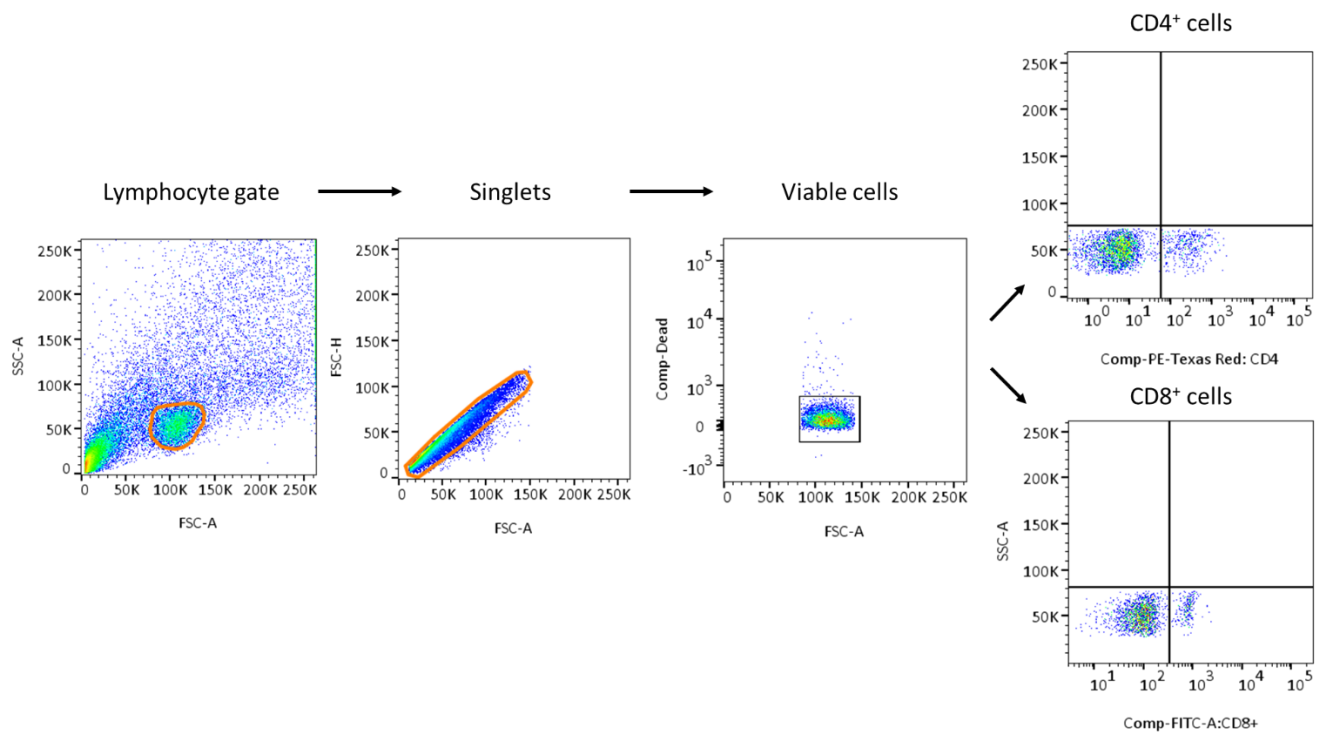


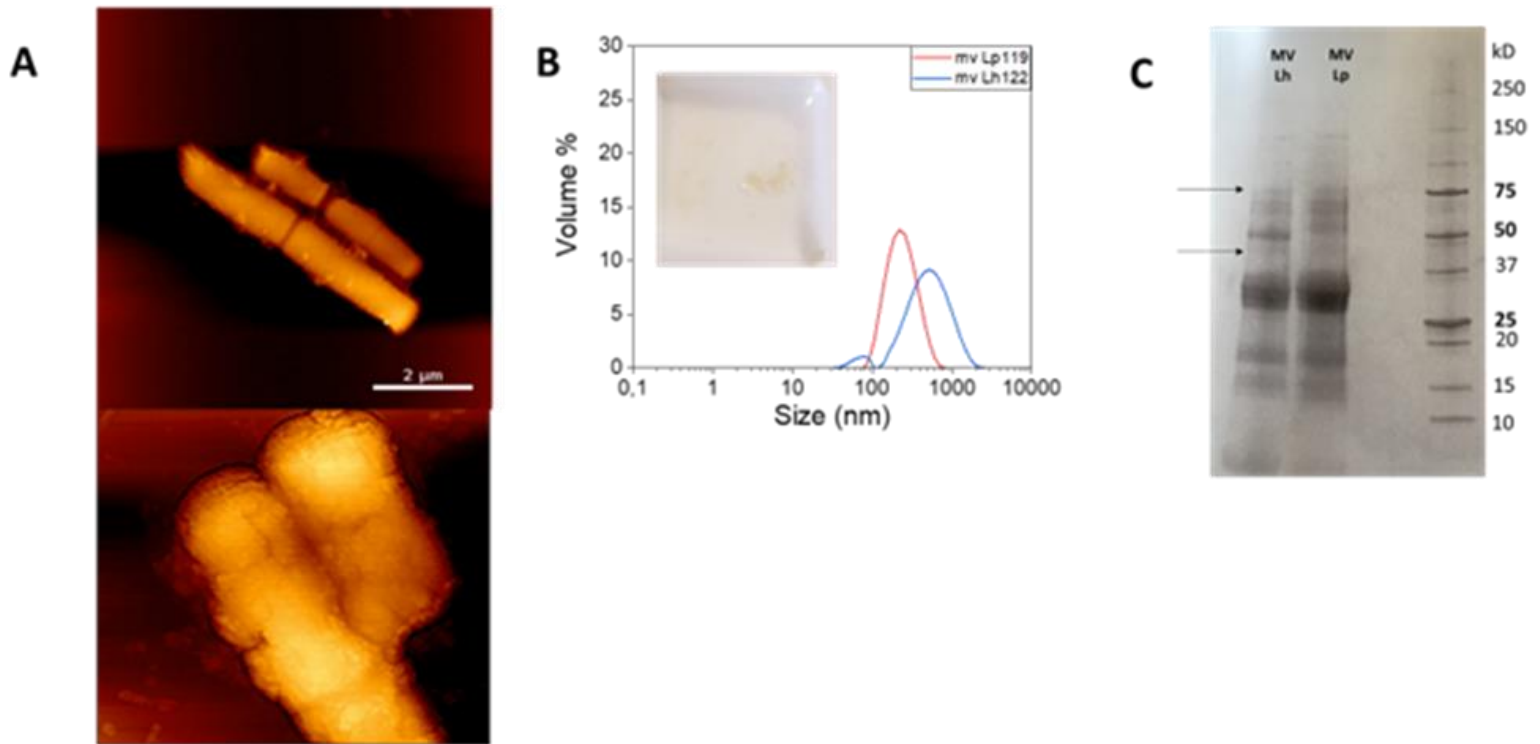
## Supplementary figures



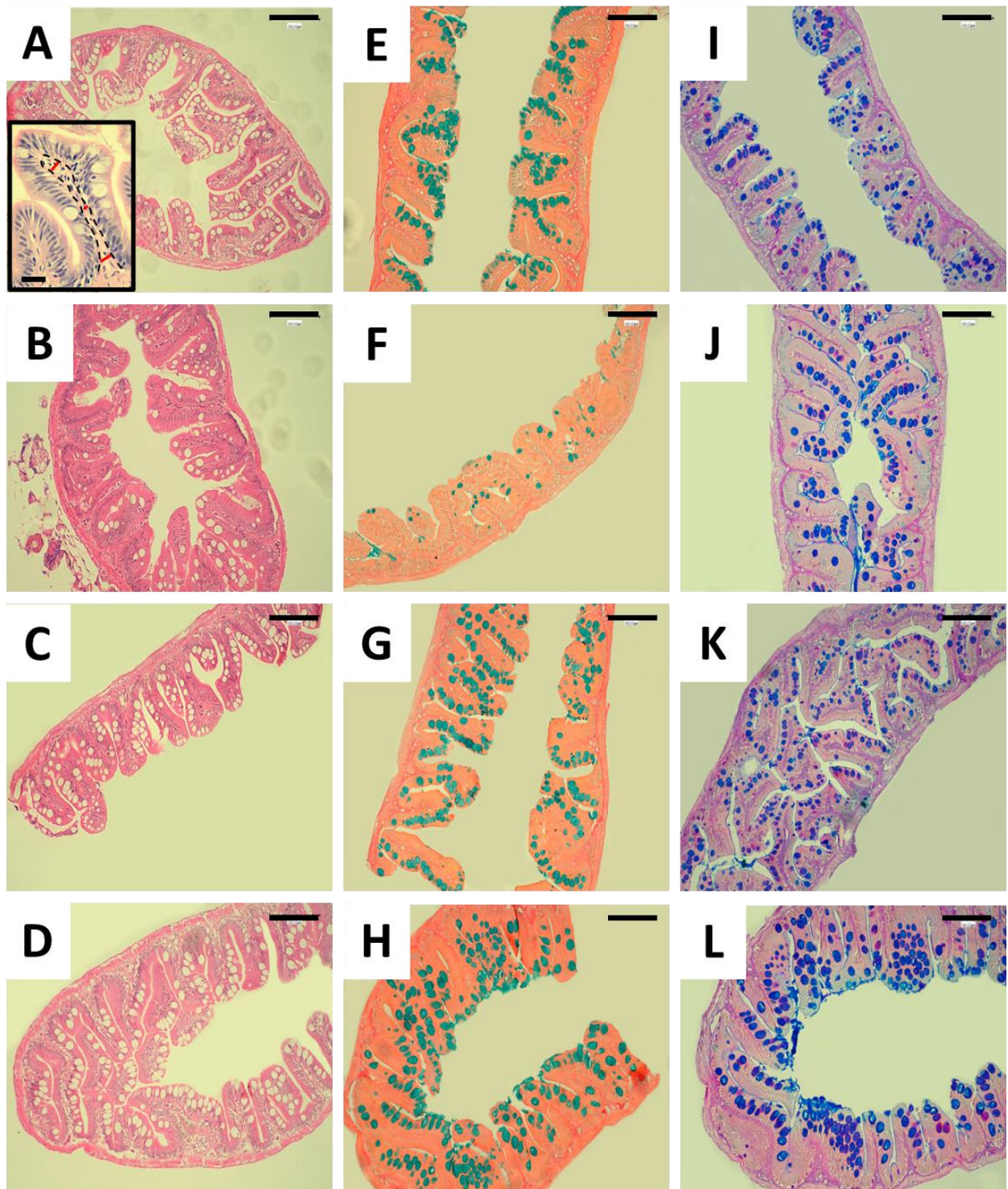
**Figure S1.** Schematic showing the posterior intestine of zebrafish.



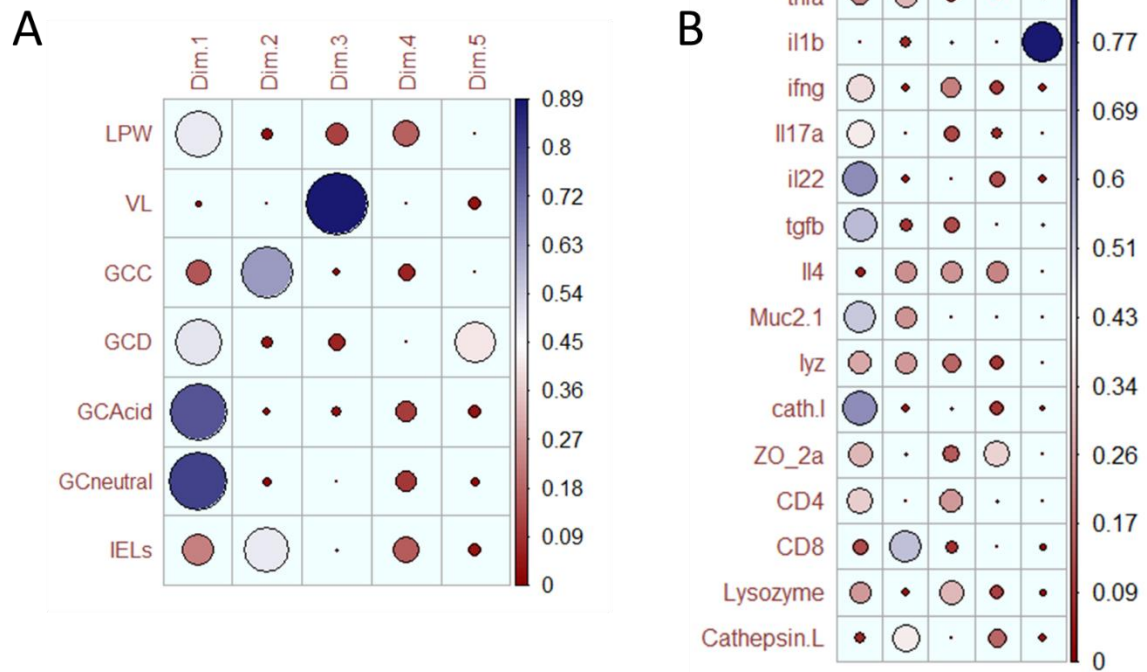
**Figure S2.** Gating strategy used to determine specific populations of CD4<sup>+</sup> and CD8<sup>+</sup> cells from a heterogeneous population of cells extracted from the posterior intestine of zebrafish.



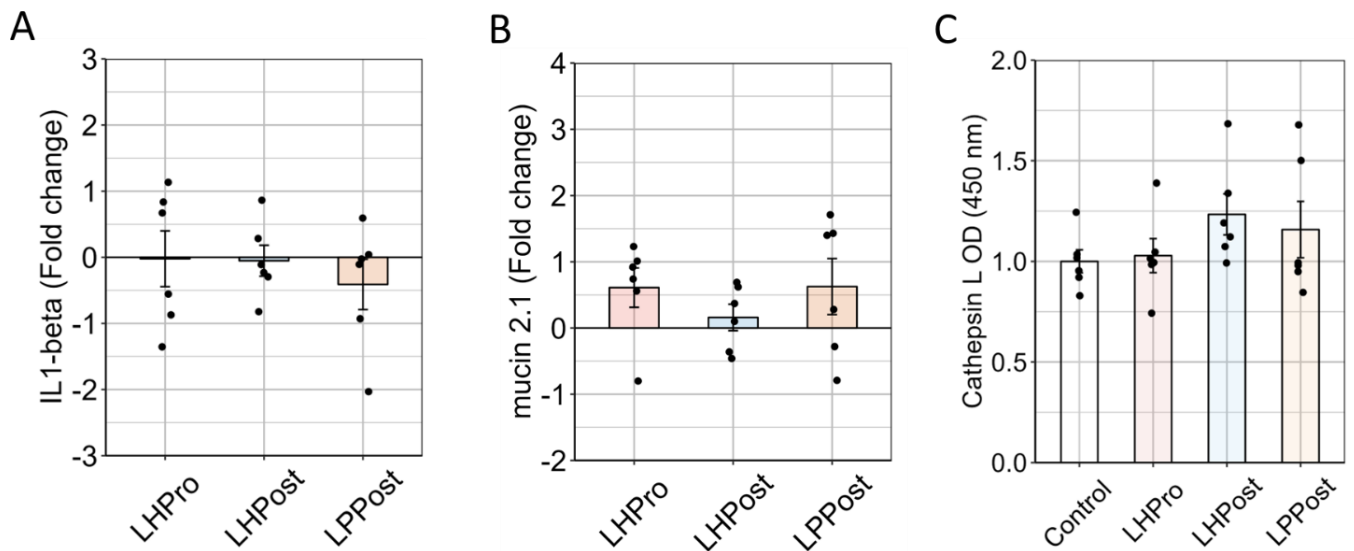
**Figure S3.** Extracellular membrane vesicles are present in heat-inactivated Lactobacilli. A) Atomic force microscopy (AFM) image of *L. helveticus* (Lh) HA-122 showing membrane vesicles (MVs). B) Size distribution of MVs assessed by DLS with a picture of MVs. C) Coomassie blue stained SDS-PAGE gel of purified MVs from MVs from *L. helveticus* (Lh) HA-122 and *L. plantarum* (Lp) HA-119. MVs with equal number of MVs were loaded.



**Figure S4.** Representative micrographs of posterior intestinal sections from each group; A-I control group; B-J LHPro group; C-K LHPost group and D-L LPPost group. A-D display intestinal sections stained with Haematoxylin and Eosin and E-H display images stained with Alcian Blue van-Geison identifying goblet cells stained as blue colour. I-L display images stained with Ab-PAS identifying goblet cell chemotype, blue = acidic mucins, magenta = neutral mucins and purple = both acidic and neutral mucins. Sections were taken at 200 x magnification and the scale bar represents 100  $\mu\text{m}$ . Image on top right in A, displays a micrograph of a representative villi indicating in red how the lamina propria width was calculated from an average of three measurements. Dashed lines display outline of lamina propria, and scale bar represents 10  $\mu\text{m}$  at 400 x magnification.



**Figure S5.** Correlation matrix plots showing the highest variable contributions to each dimension on A) PCA plot shown in Figure 2A; B) PCA plot shown in Figure 6A.



**Figure S6.** Gene expression and protein marker for barrier protection and regulation. A) *IL1 $\beta$*  gene expression (n=6/ treatment; log 2 fold change); B) *mucin2.1* gene expression (n=6/treatment; log 2 fold change); C) Cathepsin L protein expression as measured by ELISA (n=6/treatment).