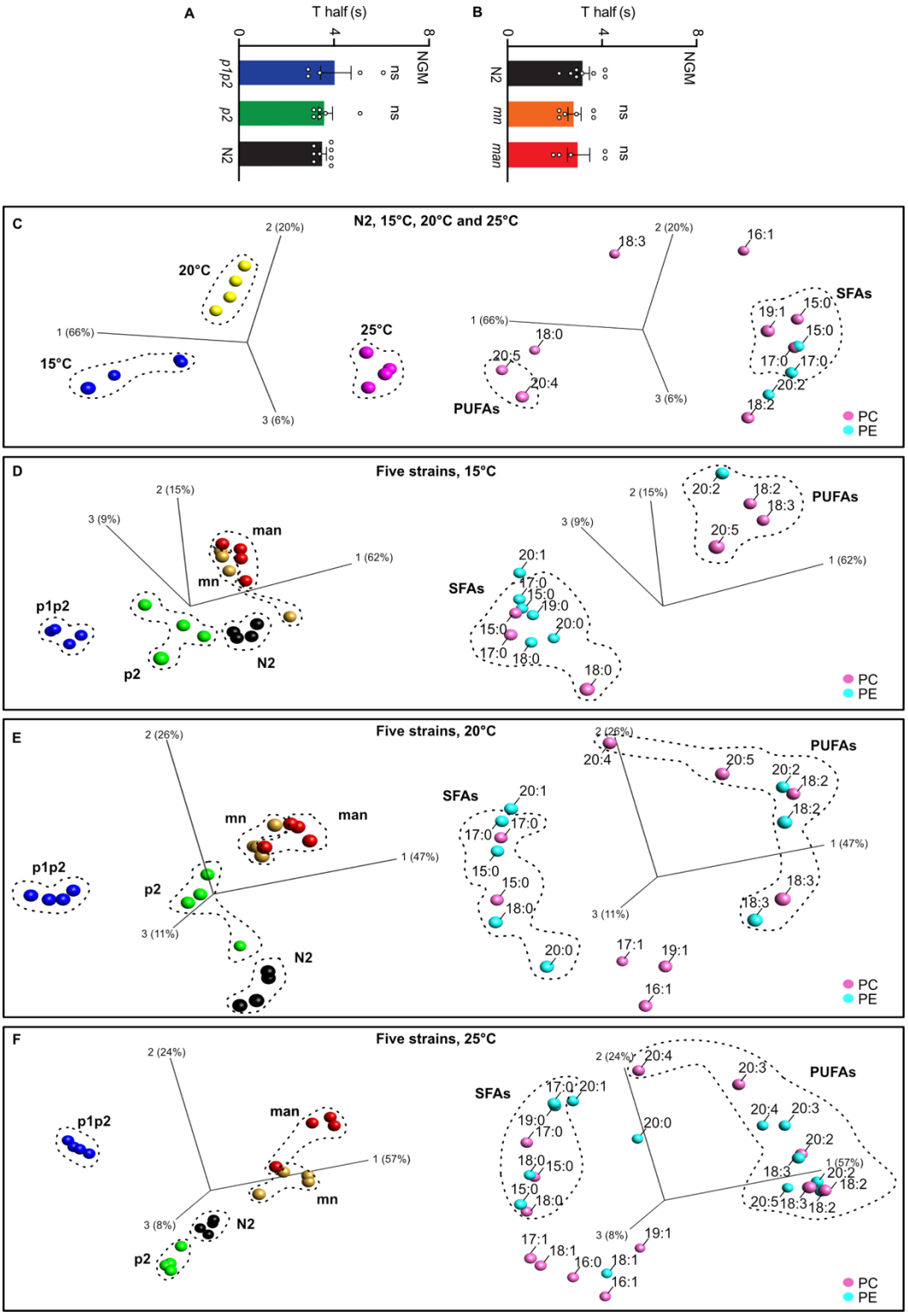

Fig. S1. Membrane Fluidity and FA composition. (A-B) T_{half} obtained from FRAP experiments for the five strains studied at 20°C on NGM; the N2 strain was included as reference in both sets of experiments: ns indicate not significant versus N2. **(C-F)** Principal component analysis of the PC and PE FA composition of N2 at 15°C, 20°C and 25°C and of the five strains also at 15°C, 20°C and 25°C; only FAs that differed significantly ($q<0.05$ in ANOVA) are shown. Note that C and F are also part of main Fig. 2

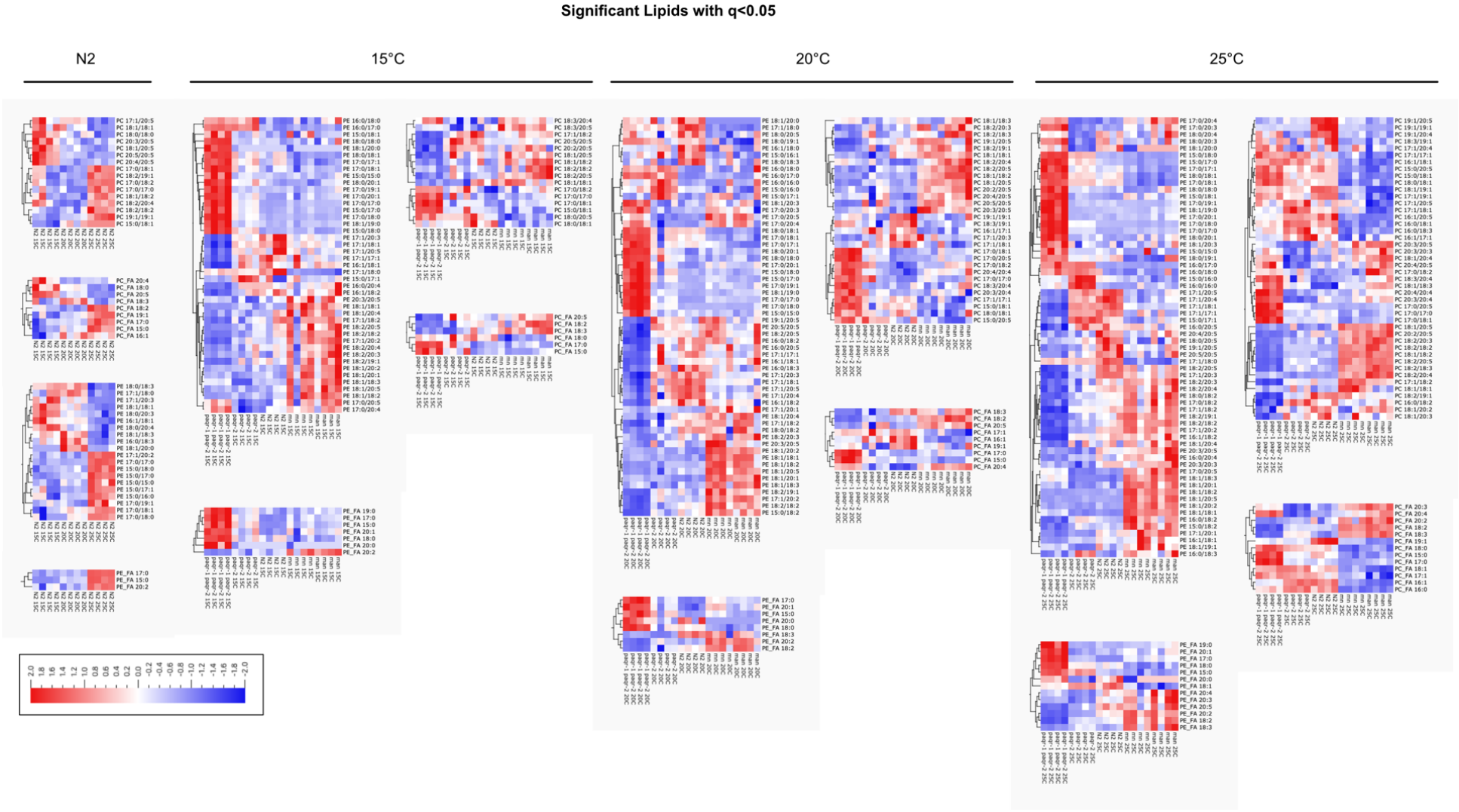

Fig. S2. Heat maps of PC and PE compositions. Heat maps of various lipid types for worms of the indicate genotypes and cultivated at the indicated temperatures. Only lipids showing significant changes (q<0.05 in ANOVA) are shown. The variance for each lipid type was normalized to 1, and the scale at bottom left applies to all panels.

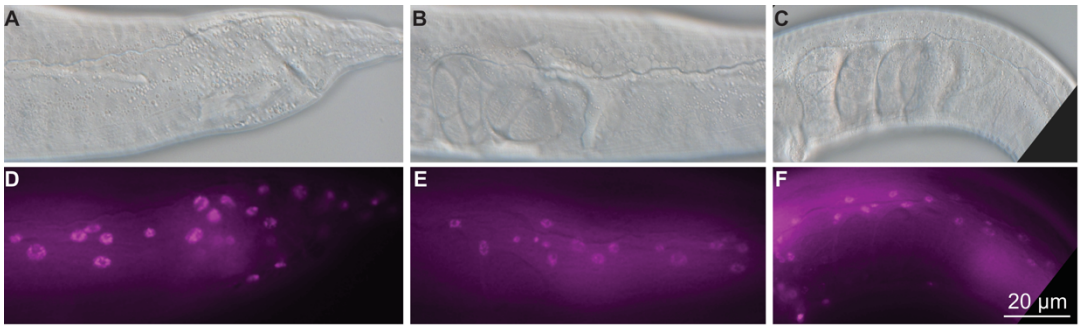

Fig. S3. Hoechst staining labels numerous nuclei. Images of worms stained with Hoechst 34580 in M9 for 30 min. **(A-C)** DIC Images and **(D-F)** images with Hoechst positive throughout the body.

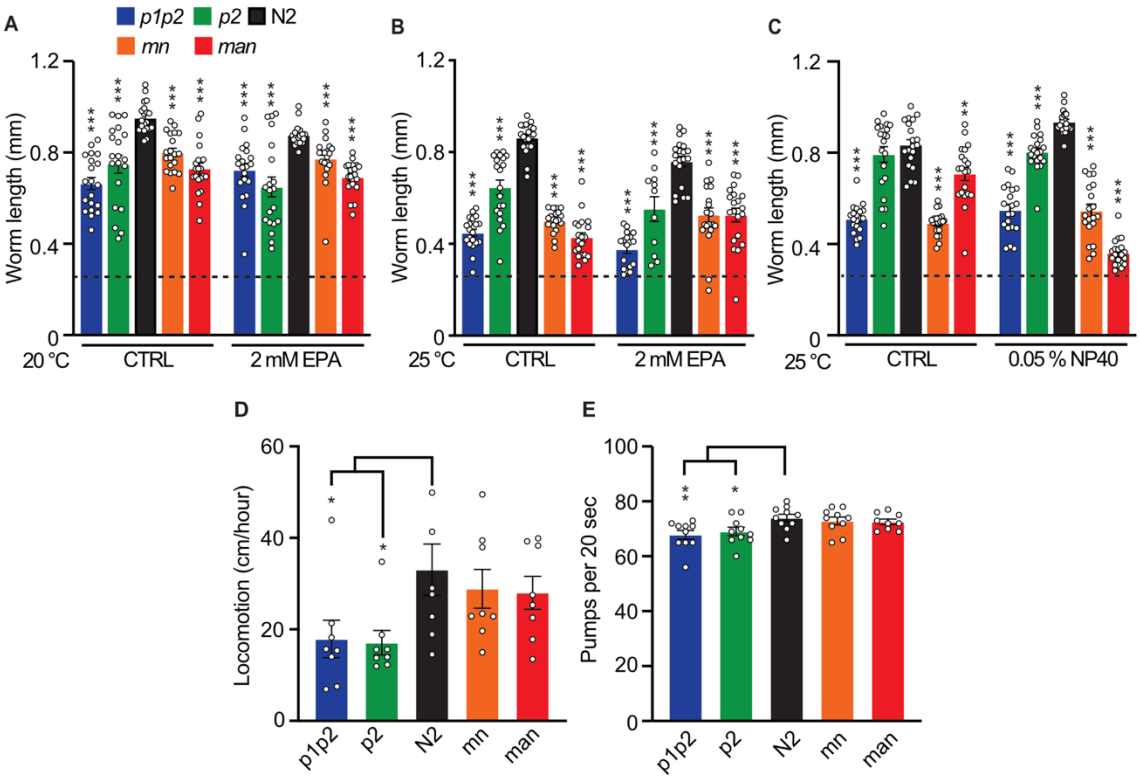

Fig. S4. Locomotion, pharyngeal pumping rate and growth in various conditions. (A) Locomotion rate. **(B)** Pharyngeal pumping rate. **(C-E)** Length of worms cultivated at the indicated temperatures and with the indicated culture condition. The dashed line indicates the length of the L1s at the start of the experiment. * P<0.05, ** P<0.01 and *** P<0.001 vs N2.

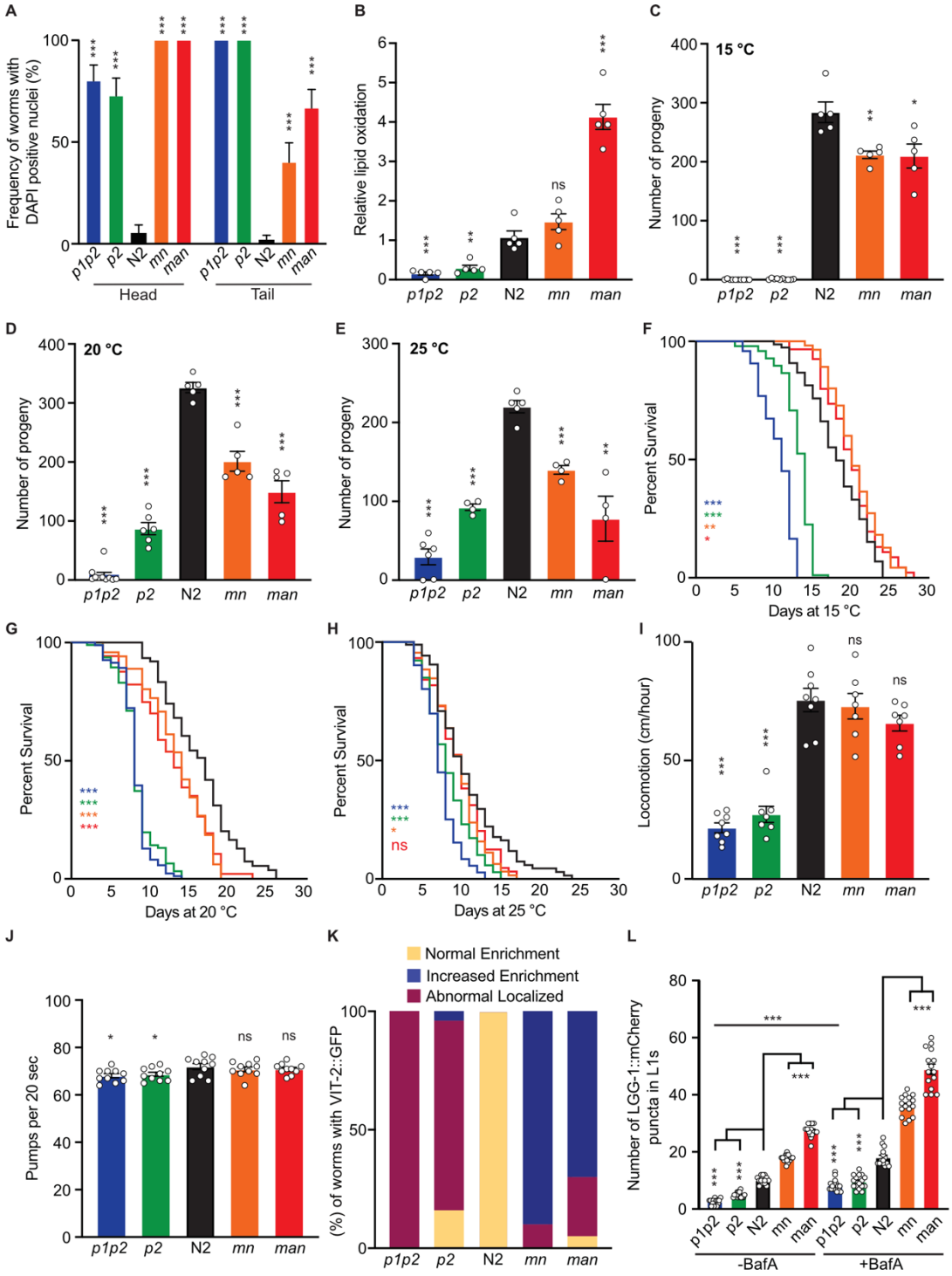

Fig. S5. Additional repeats of studied cellular and physiological traits. (A) Frequency of worms with DAPI positive nuclei in the head and tail region *(p1p2*, n=25; *p2*, n=55; N2, n=60; *mn*, n=50; *man*, n=60). **(B)** Quantification of the relative lipid oxidation, ratio of oxidized and non-oxidized BODIPY$^{581-591}$-C11; n=5 for all genotypes. **(C-E)** Brood sizes (n≥4) for all the five strains at 15°C, 20°C and 25°C respectively. **(F-H)** Lifespans (n=100) for all the five strains 15°C, 20°C and 25°C respectively. **(I)** Locomotion (n≥7) rate. **(J)** Pharyngeal pumping rate (n=10). **(K)** Quantification of the VIT-2 GFP phenotypes classified into three categories (n=25-50). **(L)** Quantification of the LGG1::mCherry puncti in worms from the five different strains incubated as L1s in M9 buffer or M9 buffer containing 25 µM BafA1 for 4 hours before imaging; n=15. * P<0.05, ** P<0.01, *** P<0.001 and not significant (ns) vs N2.