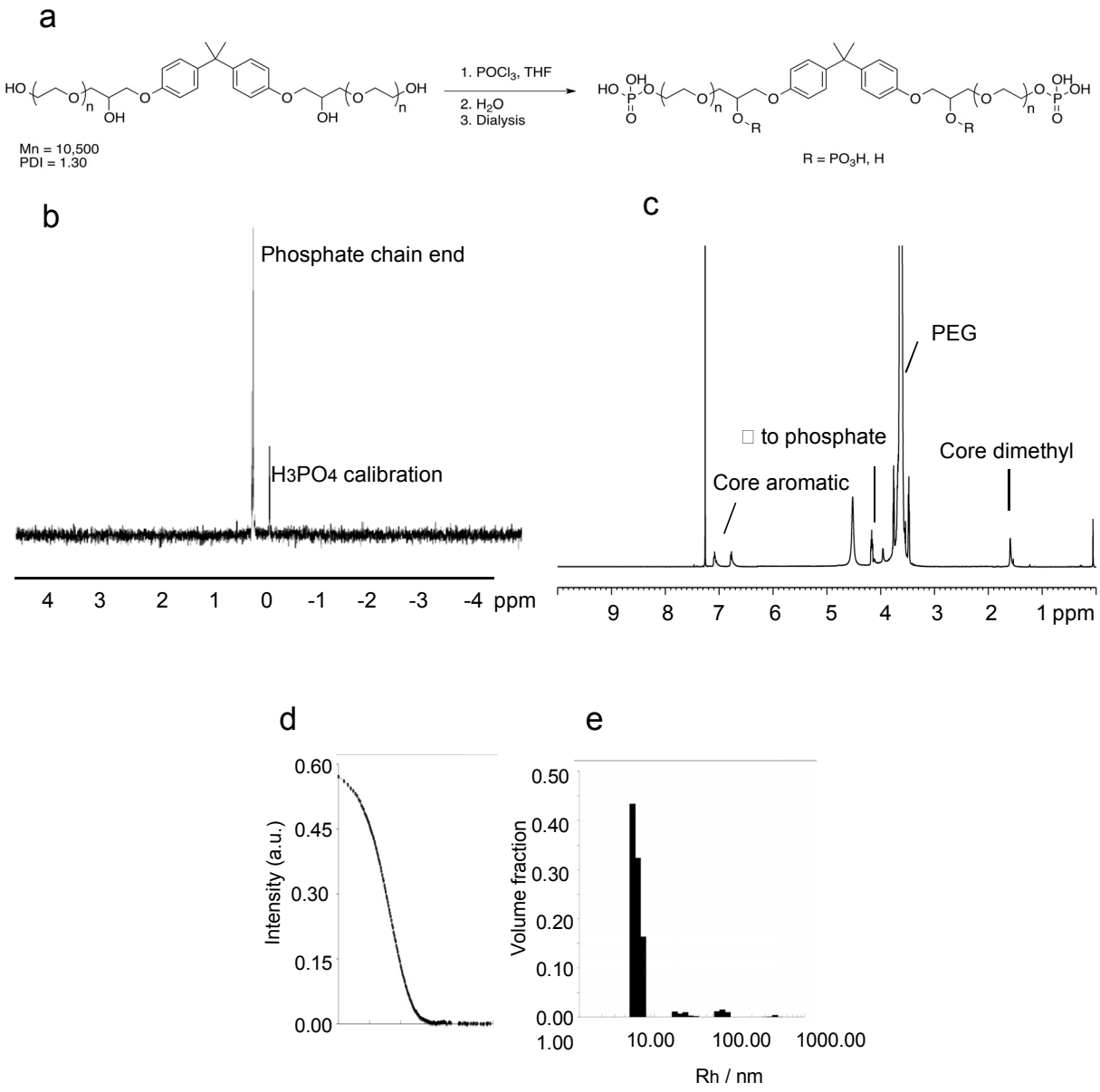
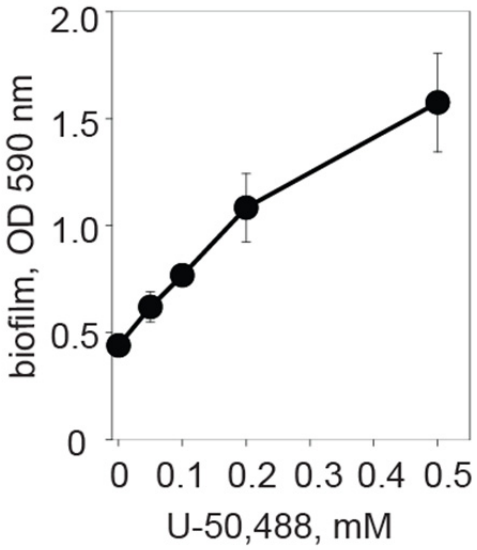
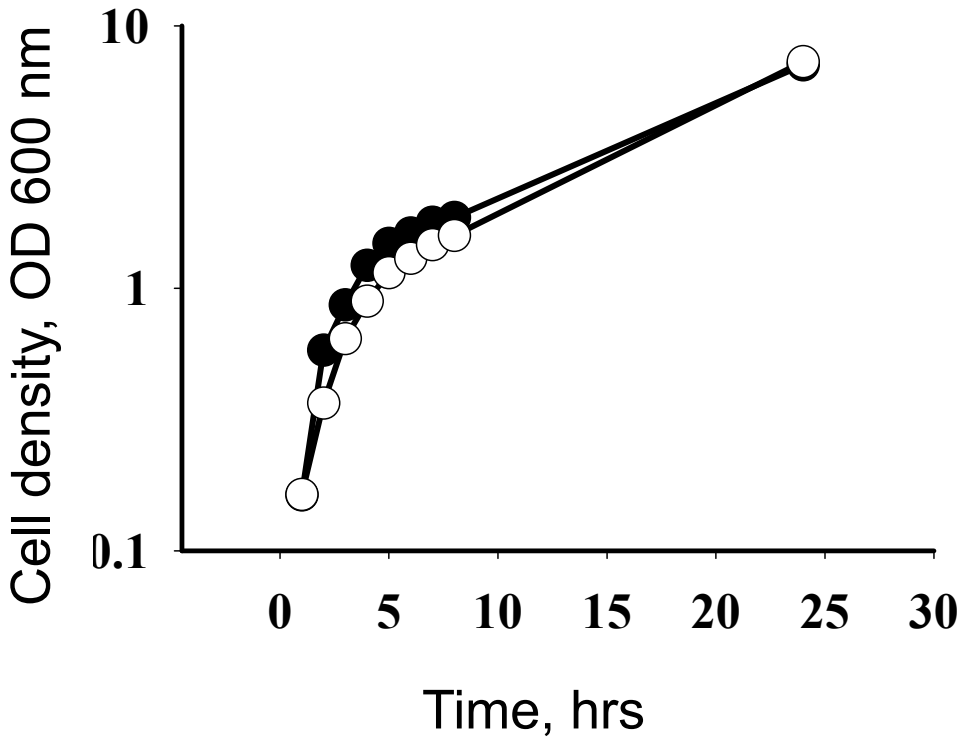


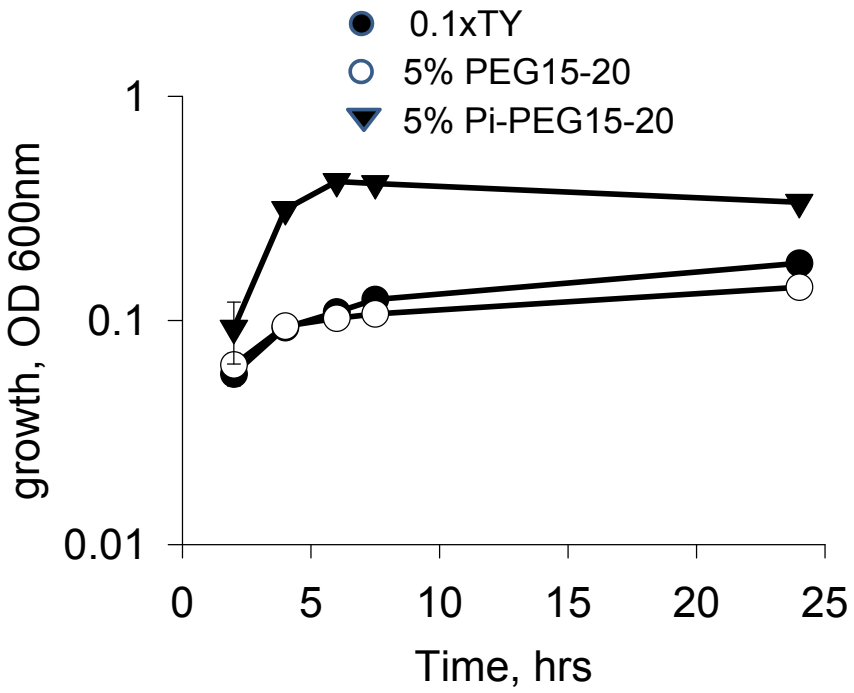
Supplemental Fig.S1. **Structure analysis of Pi-PEG15-20**. **(a)** Steps in the phosphorylation of PEG15-20 to Pi-PEG15-20; **(b)** ^{31}P NMR spectrum of Pi-PEG15-20 calibrated to H_3PO_4 (0 ppm); (**c**) ^{1}H NMR spectrum of Pi-PEG15-20; (**d,e**) Light scattering analysis of Pi-PEG15-20.



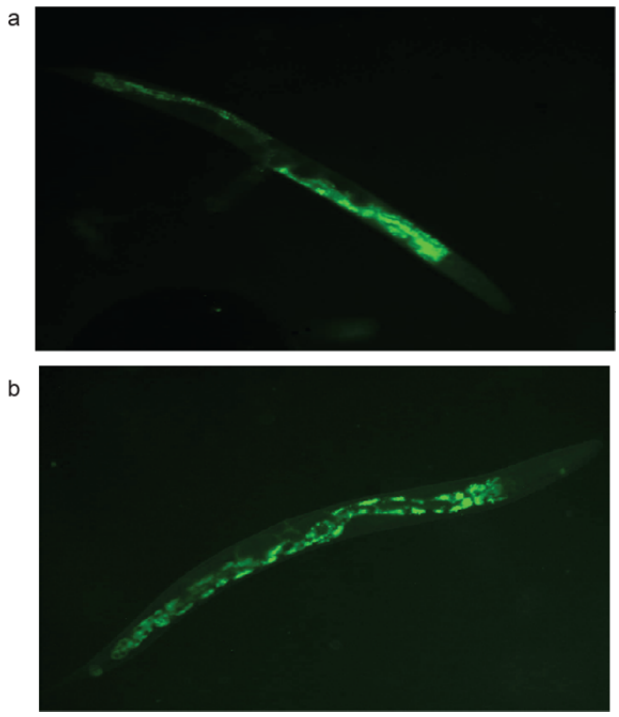
Supplemental Figure S2. Kappa-opioid U-50,488 induces biofilm formation in *P. aeruginosa* MPAO1. MPAO1 was grown in TSB media with varying concentrations of U-50,488 in polystyrene 96-well plates at 37 ^{0}C, under slow shaking conditions (100 rpm). Ten repeats were performed for each group. Supernatant including planktonic cells and liquid medium was then discarded and wells were gently washed with PBS to remove non-adherent cells. Remaining cells sticking to the plastic surfaces were stained with crystal violet.



Supplemental Figure S3. Growth curves of *P. aeruginosa* MPAO1 in TSB medium (closed circles) and in TSB+5% Pi- PEG15-20 (open circles). n=3/group.



Supplemental Figure S4. Growth curves of *P. aeruginosa* MPAO1 in nutrient poor 0.1xTY medium in the presence of either PEG15-20 or Pi-PEG15-20. n=3/group.



Supplemental Figure S5. Microscopy images of the intestinal tubes of *C. elegans* following 3 h of co-incubation in low nutrient medium 0.1xTY with *C. albicans* stained with PKH67 without (a) and with (b) 5% Pi-PEG15-20.