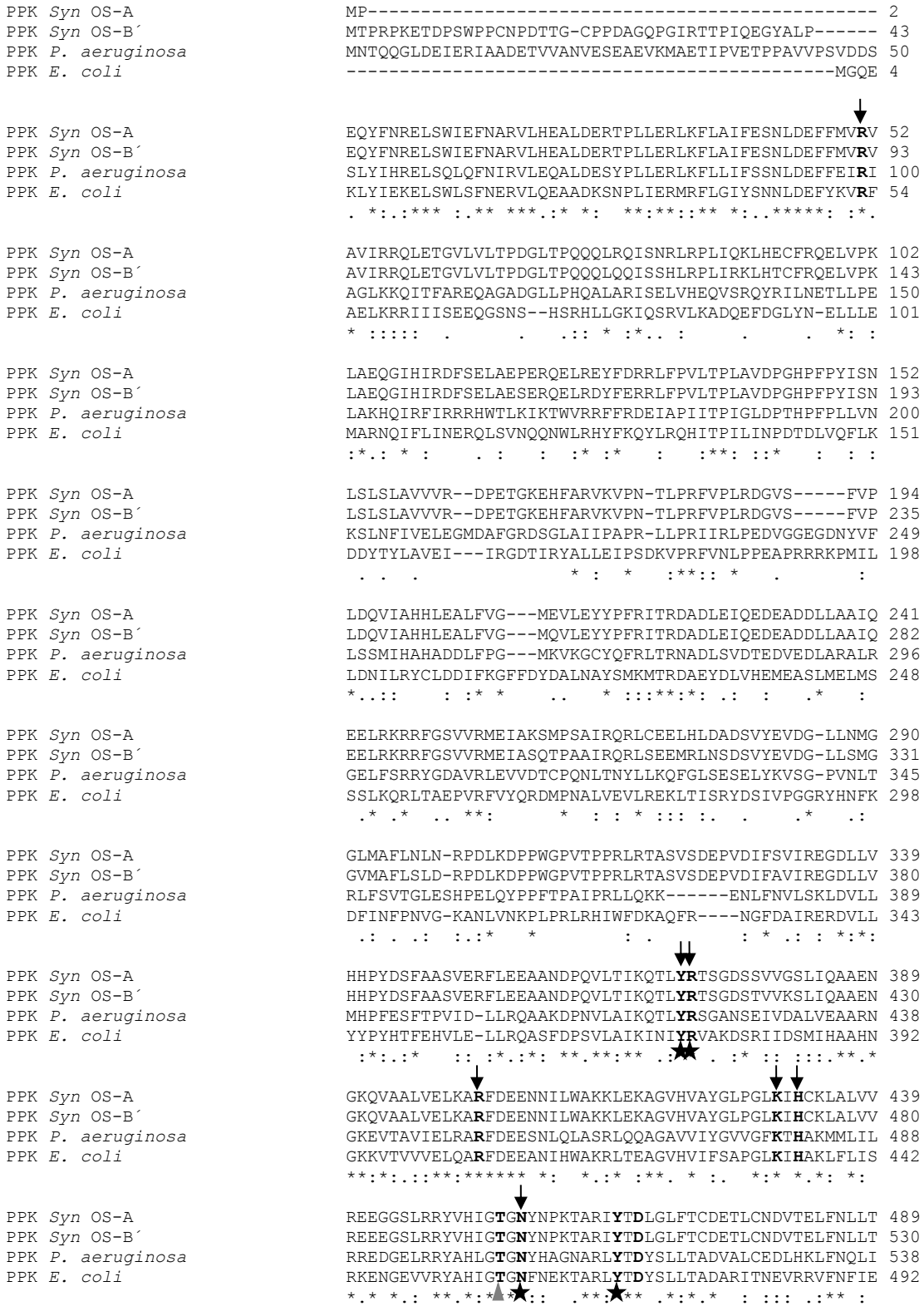
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PPK Syn OS-B´ MTPRPKETDPSWPPCNPDTTG-CPPDAGQPGIRTTPIQEGYALP------ 43
PPK P. aeruginosa MNTQQGLDEIERIAADETVVANVESEAEVKMAETIPVETPPAVVPSVDDS 50
PPK E. coli ----------MGQE 4
PPK Syn OS-A EQYFNRELSWIEFNARVLHEALDERTPLLERLKFLAIFESNLDEFFMVRV 52
PPK Syn OS-B´ EQYFNRELSWIEFNARVLHEALDERTPLLERLKFLAIFESNLDEFFMVRV 93
PPK P. aeruginosa SLYIHRELSQLQFNIRVLEQALDESYPLLERLKFLLIFSSNLDEFFEIRI 100
PPK E. coli KLYIEKELSWLSFNERVLQEAADKSNPLIERMRFLGIYSNNLDEFYKVRF 54
PPK Syn OS-A AVIRRQLETGVLVLTPDGLTPQQQLRQISNRLRPLIQKLHECFRQELVPK 102
PPK Syn OS-B´ AVIRRQLETGVLVLTPDGLTPQQQLQQISSHLRPLIRKLHTCFRQELVPK 143
PPK P. aeruginosa AGLKKQITFAREQAGADGLLPHQALARISELVHEQVSRQYRILNETLLPE 150
PPK E. coli AELKRRIIISEEQGSNS--HSRHLLGKIQSRVLKADQEFDGLYN-ELLLE 101
PPK Syn OS-A LAEQGIHIRDFSELAEPERQELREYFDRRLFPVLTPLAVDPGHPFPYISN 152
PPK Syn OS-B´ LAEQGIHIRDFSELAESERQELRDYFERRLFPVLTPLAVDPGHPFPYISN 193
PPK P. aeruginosa LAKHQIRFIRRRHWTLKIKTWVRRFFRDEIAPIITPIGLDPTHPFPLLVN 200
PPK E. coli MARNQIFLINERQLSVNQQNWLRHYFKQYLRQHITPILINPDTDLVQFLK 151
PPK Syn OS-A LSLSLAVVVR--DPETGKEHFARVKVPN-TLPRFVPLRDGVS-----FVP 194
PPK Syn OS-B´ LSLSLAVVVR--DPETGKEHFARVKVPN-TLPRFVPLRDGVS-----FVP 235
PPK P. aeruginosa KSLNFIVELEGMDAFGRDSGLAIIPAPR-LLPRIIRLPEDVGGEGDNYVF 249
PPK E. coli DDYTYLAVEI---IRGDTIRYALLEIPSDKVPRFVNLPPEAPRRRKPMIL 198
PPK Syn OS-A LDQVIAHHLEALFVG---MEVLEYYPFRITRDADLEIQEDEADDLLAAIQ 241
PPK Syn OS-B´ LDQVIAHHLEALFVG---MQVLEYYPFRITRDADLEIQEDEADDLLAAIQ 282
PPK P. aeruginosa LSSMIHAHADDLFPG---MKVKGCYQFRLTRNADLSVDTEDVEDLARALR 296
PPK E. coli LDNILRYCLDDIFKGFFDYDALNAYSMKMTRDAEYDLVHEMEASLMELMS 248
PPK Syn OS-A EELRKRRFGSVVRMEIAKSMPSAIRQRLCEELHLDADSVYEVDG-LLNMG 290
PPK Syn OS-B´ EELRKRRFGSVVRMEIASQTPAAIRQRLSEEMRLNSDSVYEVDG-LLSMG 331
PPK P. aeruginosa GELFSRRYGDAVRLEVVDTCPQNLTNYLLKQFGLSESELYKVSG-PVNLT 345
PPK E. coli SSLKQRLTAEPVRFVYQRDMPNALVEVLREKLTISRYDSIVPGGRYHNFK 298
PPK Syn OS-A GLMAFLNLN-RPDLKDPPWGPVTPPRLRTASVSDEPVDIFSVIREGDLLV 339
PPK Syn OS-B´ GVMAFLSLD-RPDLKDPPWGPVTPPRLRTASVSDEPVDIFAVIREGDLLV 380
PPK P. aeruginosa RLFSVTGLESHPELQYPPFTPAIPRLLQKK------ENLFNVLSKLDVLL 389
PPK E. coli DFINFPNVG-KANLVNKPLPRLRHIWFDKAQFR----NGFDAIRERDVLL 343
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PPK Syn OS-B´ HHPYDSFAASVERFLEEAANDPQVLTIKQTLYRTSGDSTVVKSLIQAAEN 430
PPK P. aeruginosa MHPFESFTPVID-LLRQAAKDPNVLAIKQTLYRSGANSEIVDALVEAARN 438
PPK E. coli YYPYHTFEHVLE-LLRQASFDPSVLAIKINIYRVAKDSRIIDSMIHAAHN 392
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PPK Syn OS-B´ GKQVAALVELKARFDEENNILWAKKLEKAGVHVAYGLPGLKIHCKLALVV 480
PPK P. aeruginosa GKEVTAVIELRARFDEESNLQLASRLQQAGAVVIYGVVGFKTHAKMMLIL 488
PPK E. coli GKKVTVVVELQARFDEEANIHWAKRLTEAGVHVIFSAPGLKIHAKLFLIS 442
PPK Syn OS-A REEGGSLRRYVHIGTGNYNPKTARIYTDLGLFTCDETLCNDVTELFNLLT 489
PPK Syn OS-B´ REEEGSLRRYVHIGTGNYNPKTARIYTDLGLFTCDETLCNDVTELFNLLT 530
PPK P. aeruginosa RREDGELRRYAHLGTGNYHAGNARLYTDYSLLTADVALCEDLHKLFNQLI 538
PPK E. coli RKENGEVVRYAHIGTGNFNEKTARLYTDYSLLTADARITNEVRRVFNFIE 492


**Figure S1. Alignment of PPK1 sequences from *Syn* OS-A, *Syn* OS-B´, *P. aeruginosa* and, *E. coli*.**

The residues involved in ATP binding are indicated with asterisks; residues involved in poly P synthesis tunnel are indicated with arrows; the autophosphorylation site at H435, a general acid catalyst site H592 (corresponding to the EcPPK1 sequence), and the residues involved in the autophosphorylation (corresponding to D470, E623, S610, and T458 in EcPPK1) are indicated with grey triangles. GeneBank accession numbers: YP_475861.1, Syn OS-A PPK1, YP_478292.1, Syn OS-B´PPK1), BAA16389 (EcPPK1), and BAA22565 (PaPPK1).

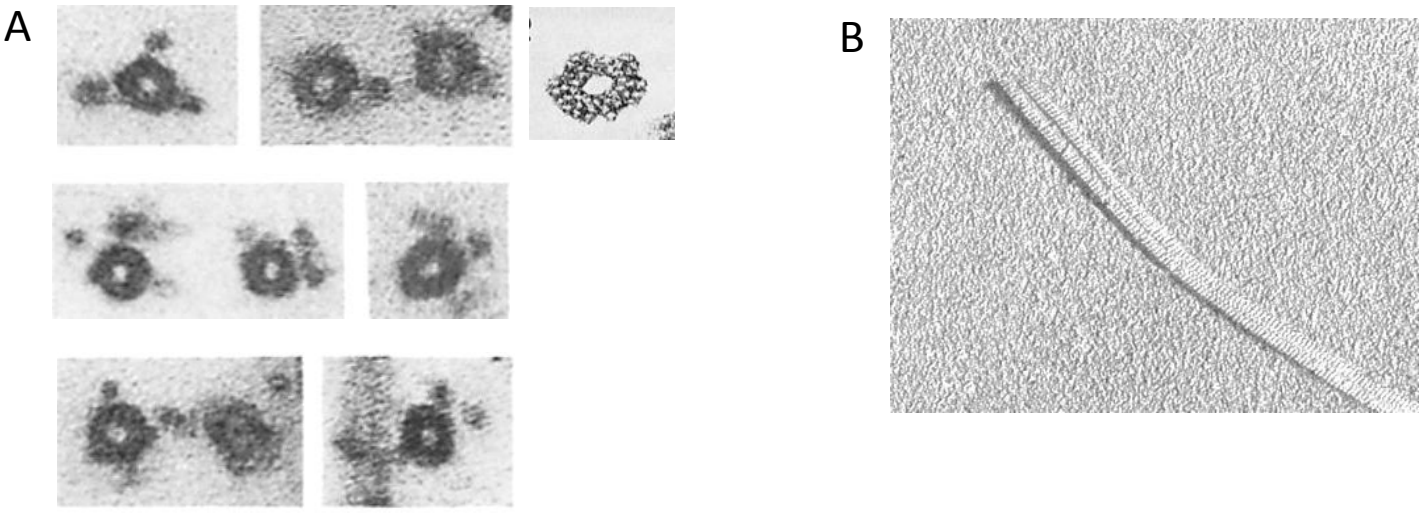


**Figure S2. Electron microscopy of filaments of *P. aeruginosa* PPK1**. PaPPK1 samples were resuspended in 50 mM Tris·HCl (pH 7.4), 0.1 M KCl, and 0.5 mM ATP PPK1 reaction was started with the addition of the enzyme and samples were taken at 30 s of the reaction and 45 min. The samples were centrifuged at 20,000 rpm for 30 min in a TL100 ultracentrifuge (Beckman Coulter), all poly P synthesis activity was contained in the pellet. Samples were applied to a 400-mesh carbon/formvar-coated Cu grid, allowed to settle for 30 sec, washed with two drops of water, and stained with uranyl acetate (1%) for 1 min. Samples were analyzed in a JEOL JEM-1230 transmission electron microscope at 80 kV; pictures were taken with a digital imaging camera (Gatan, Pleasanton, CA), at the Cell Imaging Facility, Beckman Center, Stanford University.

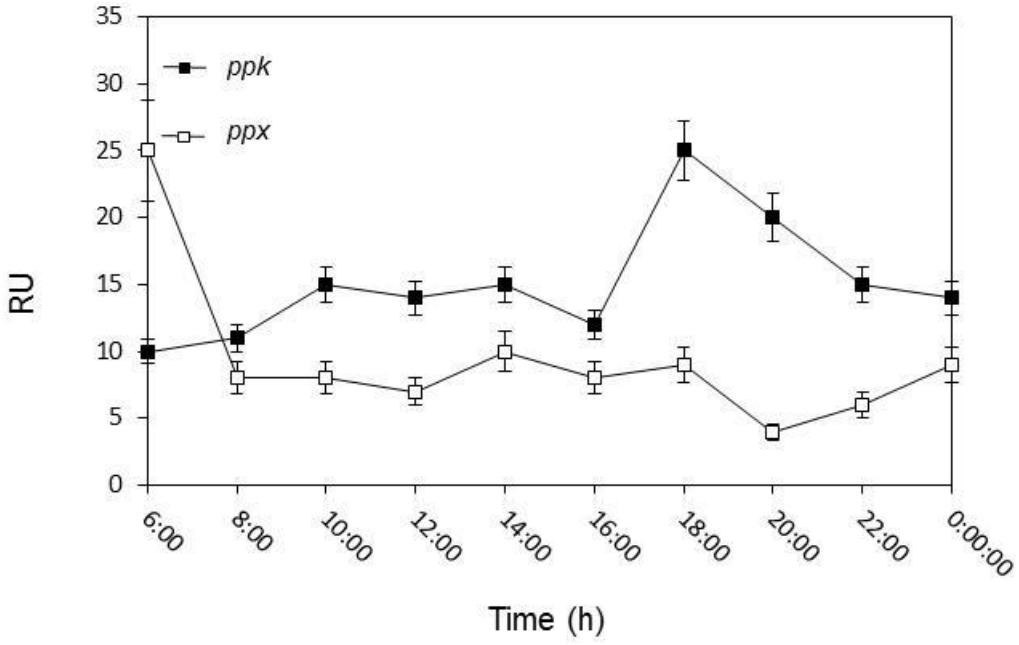


**Figure. S3. Transcript levels of *ppk* and *ppx* in axenic cultures of *Syn* OS-B´over a diel cycle.** Quantification of transcripts from *ppk* and *ppx* over a diel cycle . Cultures of *Syn* OS-B' (CIW 10) were grown at 50˚C in liquid medium D [28] supplemented with 10 mM HEPES, pH 8.2, and Va vitamin -solution [29], as described by Adams [12]. Cultures were aerated with a mixture of 3% $CO_2$ in air in a 50˚C incubator and at a light intensity of ~75 µmol photon $m^{-2}s^{-1}$.