| Enterobacteriaceae | Endosymbiont | Gammaproteobacteria | Proteobacteria | ia                |  | Essentiality             |
|--------------------|--------------|---------------------|----------------|-------------------|--|--------------------------|
| Enterol            | Endosy       | Gamm                | Proteol        | Bacteria Bacteria | alaS<br>aspS<br>cysS<br>dnaB<br>dnaF   | Non-essential  Essential |
|                    |              |                     |                |                   | alaS<br>scysSB<br>dnaEN<br>dnaX<br>engG<br>frr AY<br>ftsZX<br>ftsZX<br>ftsZX<br>ftsSSABC<br>murG<br>pheS<br>prisSSABC<br>murGS<br>prisSSABC<br>murGS<br>prisSSABC<br>murGS<br>prisSSABC<br>murGS<br>prisSSABC<br>phesSaBC<br>murGS<br>prisSSABC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phesSaBC<br>phe |                          |
|                    |              |                     |                |                   | gltX<br>gmk<br>gyrB<br>hisS<br>ileS<br>infA<br>infB  |                          |
|                    |              |                     |                |                   | infC<br>leuS<br>ligA<br>mraY<br>murD<br>murG<br>pheS<br>prfR   |                          |
|                    |              |                     |                |                   | pros<br>prs<br>pyrH<br>ribF<br>rplB<br>rplC<br>rplD  |                          |
|                    |              |                     |                |                   | rpie<br>rpif<br>rpiM<br>rpiO<br>rpiO<br>rpiQ<br>rpiQ<br>rpiT   |                          |
|                    |              |                     |                |                   | rpIV<br>rpIW<br>rpoA<br>rpoB<br>rpoD<br>rpsC<br>rpsD   |                          |
|                    |              |                     |                |                   | rpsE<br>rpsG<br>rpsH<br>rpsJ<br>rpsK<br>rpsL<br>rpsM<br>secY<br>serS   |                          |
|                    |              |                     |                |                   | tnrS<br>tmk<br>tsf<br>tyrS<br>uppS<br>valS<br>acpP   |                          |
|                    |              |                     |                |                   | dapB<br>dapE<br>dxr<br>dxs<br>fabZ<br>glmM<br>dlmU   |                          |
|                    |              |                     |                |                   | glyS<br>hemC<br>ispE<br>ispG<br>lolC<br>lspA<br>murA<br>murC<br>murF   |                          |
|                    |              |                     |                |                   | pheT<br>ppa<br>pyrG<br>rplK<br>rplR<br>rpmB  |                          |
|                    |              |                     |                |                   | tadA<br>yidC<br>der<br>fmt<br>fusA<br>groL<br>lysS<br>map  |                          |
|                    |              |                     |                |                   | rpsB<br>adk<br>dapA<br>erpA<br>fabB<br>fbaA<br>foID<br>ftsH  |                          |
|                    |              |                     |                |                   | ftsH<br>ftsI<br>ftsW<br>gcp<br>glnS<br>groS<br>holA<br>holB  |                          |
|                    |              |                     |                |                   | ispF<br>ispH<br>lepB<br>lgt<br>loID<br>mviN<br>nrdB  |                          |
|                    |              |                     |                |                   | pgk<br>ppnK<br>ribA<br>rimN<br>rplJ<br>rplL<br>rplS<br>rplU<br>rpmD  |                          |
|                    |              |                     |                |                   | rpoH<br>rpsA<br>rpsN<br>rpsP<br>rpsQ<br>rpsS<br>secA<br>tilS   |                          |
|                    |              |                     |                |                   | trmD<br>ybeY<br>yeaZ<br>yqgF<br>ssb<br>argS<br>ffh   |                          |
|                    |              |                     |                |                   | gyrA<br>metK<br>nusA<br>acpS<br>asd<br>asnS<br>bamD<br>cca<br>dapD   |                          |
|                    |              |                     |                |                   | def<br>dnaG<br>dut<br>eno<br>fabl<br>fldA<br>folC  |                          |
|                    |              |                     |                |                   | gapA<br>glyQ<br>ispD<br>metG<br>murB<br>murI<br>nusB<br>obg<br>pth   |                          |
|                    |              |                     |                |                   | pth<br>rho<br>ribB<br>ribD<br>ribE<br>ribH<br>rimM<br>rpmA   |                          |
|                    |              |                     |                |                   | rpsH<br>rpsU<br>suhB<br>dnaA<br>era<br>murF<br>rpoC<br>cdsA  |                          |
|                    |              |                     |                |                   | coaD<br>hemH<br>ispB<br>kdtA<br>lptD<br>lpxA<br>lpxB<br>lpxC   |                          |
|                    |              |                     |                |                   | lpxD<br>lpxK<br>pgsA<br>secD<br>yjgQ<br>accA<br>accB   |                          |
|                    |              |                     |                |                   | accC<br>accD<br>coaBC<br>fabA<br>ftsQ<br>kdsA<br>kdsB  |                          |
|                    |              |                     |                |                   | lolA<br>lolB<br>lpxH<br>mrdA<br>rpmC<br>secE<br>yjeE<br>yjgP<br>coaA<br>coaE   |                          |
|                    |              |                     |                |                   | dnaC<br>dnaT<br>fabD<br>fabH<br>foIB<br>foIE<br>glmS<br>hemA   |                          |
|                    |              |                     |                |                   | hemB<br>hemD<br>hemE<br>hemG<br>lexA<br>Int<br>lptA  |                          |
|                    |              |                     |                |                   | lptE<br>mrdB<br>mreC<br>mreD<br>msbA<br>mukB<br>mukE<br>mukF<br>nadD   |                          |
|                    |              |                     |                |                   | nadE<br>plsB<br>plsC<br>priA<br>psd<br>pssA  |                          |
|                    |              |                     |                |                   | rplY<br>rpmH<br>rpsT<br>secF<br>thyA<br>topA<br>ubiA<br>ubiB<br>ubiD   |                          |
|                    |              |                     |                |                   | ubiB<br>ubiD<br>ubiE<br>zipA<br>iscS<br>rpsI<br>nrdA<br>purB<br>aceE<br>aceF   |                          |
|                    |              |                     |                |                   | acer<br>ackA<br>ahpC<br>apaH<br>aroA<br>aroB<br>aroC<br>aroE   |                          |
|                    |              |                     |                |                   | arok<br>aroQ<br>atpA<br>atpB<br>atpC<br>atpE<br>atpF   |                          |
|                    |              |                     |                |                   | atpG<br>atpH<br>carA<br>carB<br>clpP<br>clpX<br>cls<br>csrA  |                          |
|                    |              |                     |                |                   | cyoA<br>cyoB<br>cyoC<br>cyoE<br>cysE<br>dapF<br>deaD<br>dksA   |                          |
|                    |              |                     |                |                   | dnaJ<br>dnaK<br>dnaQ<br>efp<br>folA  |                          |
|                    |              |                     |                |                   | fpr<br>gloB<br>glyA<br>gnd<br>gpmA<br>greA<br>gryE<br>grxD<br>hflC<br>hflK<br>hinT   |                          |
|                    |              |                     |                |                   | hisA<br>hisB<br>hisF<br>hisG<br>hisH<br>htpX<br>iscA<br>lon  |                          |
|                    |              |                     |                |                   | lon<br>lpdA<br>metE<br>miaA<br>minC<br>minD<br>mnmA<br>mnmE  |                          |
|                    |              |                     |                |                   | mnmG<br>nfuA<br>nth<br>nuoA<br>nuoB<br>nuoC<br>nuoF<br>nuoG  |                          |
|                    |              |                     |                |                   | nuoH<br>nuoI<br>nuoJ<br>nuoK<br>nuoL<br>nuoM<br>nuoN<br>orn  |                          |
|                    |              |                     |                |                   | pepA<br>pfkA<br>pgi<br>pgl<br>pitA<br>pnp<br>prmC<br>ptsH  |                          |
|                    |              |                     |                |                   | ptsI<br>purA<br>purH<br>pykA<br>rbfA<br>recB<br>recD<br>rlmE   |                          |
|                    |              |                     |                |                   | rlmN<br>rluC<br>rluD<br>rnc<br>rne<br>rnt<br>rpe<br>rpiA   |                          |
|                    |              |                     |                |                   | rpIA<br>rpII<br>rpmE<br>rpmF<br>rpmG<br>rpmI<br>rpmJ   |                          |
|                    |              |                     |                |                   | rpsO<br>rsmA<br>rsmD<br>rsmH<br>serC<br>smpB<br>sodB<br>sucA<br>sucB   |                          |
|                    |              |                     |                |                   | sucB<br>surA<br>tal<br>terC<br>tktA<br>tpiA<br>truA<br>truB<br>trxA<br>trxB  |                          |
|                    |              |                     |                |                   | lui<br>tusF  |                          |
|                    |              |                     |                |                   | unjC<br>yajCR<br>yajCR<br>ychF<br>ychF<br>yggX<br>yhgN<br>yibN<br>yibA<br>yrbA<br>zwi  |                          |
|                    |              |                     |                |                   | yjgF<br>yrbA<br>zwf<br>ubiG<br>hemL  |                          |