BACTERIAL SECRETION SYSTEM Type II Type IV Type VI Type I Type III Type Va Vc Intracellular toxins Cholera toxin, Exotoxin A Heat-labile (LT) toxin Cell wall-degrading enzymes Effector proteins DNA DNA-protein complexes RTX toxins HlyA, RtxA Proteases Effector proteins Needle proteins Components of the translocon YopB, YopD, LcrV Effector proteins Adhesins, proteases, toxins. Effector proteins Lipases S-layer proteins Host cell Host cell T(ygrG) Plasma membrane Plasma membrane T-pilus <mark>YscF</mark> Ysc⊕PX VirB⊉ Extracellular ∜irB3, milieu $(Y_{sc}W)$ Outer membrane TolC GspD VirB7, 9 Lip VirB1 $^{ m GspC}_{ m GspGHIJK}$ Periplasm HlyD VirB6, 8, 10 IcmF, DotU Twin arginine targeting (Tat) Sec-SRP YscJ SecDEFGY YajCYidC Inner GspFLM TatABCE HlyB ClpV PpkA membrane VirB4(VirB11) VirD4 YscVURTS (GspO) ĹFtsY : Fha1 YscN YscQL GspE (SecA)Bacterial cytoplasm PppA ၜ 0 ာ ကြား 0 0 ATP ATP ATP ATP ATP ATP ATP ATP ffh SecB Type VI Type III Type IV Type I Type II Type Va Vb Vc Outer membrane protein (OMP) Needle Secretin OMP Periplasmic protein Secreted substrate K04059 K11903 K11016 Membrane fusion protein OMP Surface/pilus protein IMP K11906 ABC transporter OMP OMP Secretin IMPIMP OMP Inner membrane protein (IMP) ATPase ATPase K11915 K11913 ATPase Regulatory protein ATPase Leaderpeptidase ATPase-associated K03225 K03223 protein Sec-SRP Twin arginine targeting (Tat) IMP IMP ATPase Secretion monitor SRP receptor Targeting protein

03070 4/12/10 (c) Kanehisa Laboratories