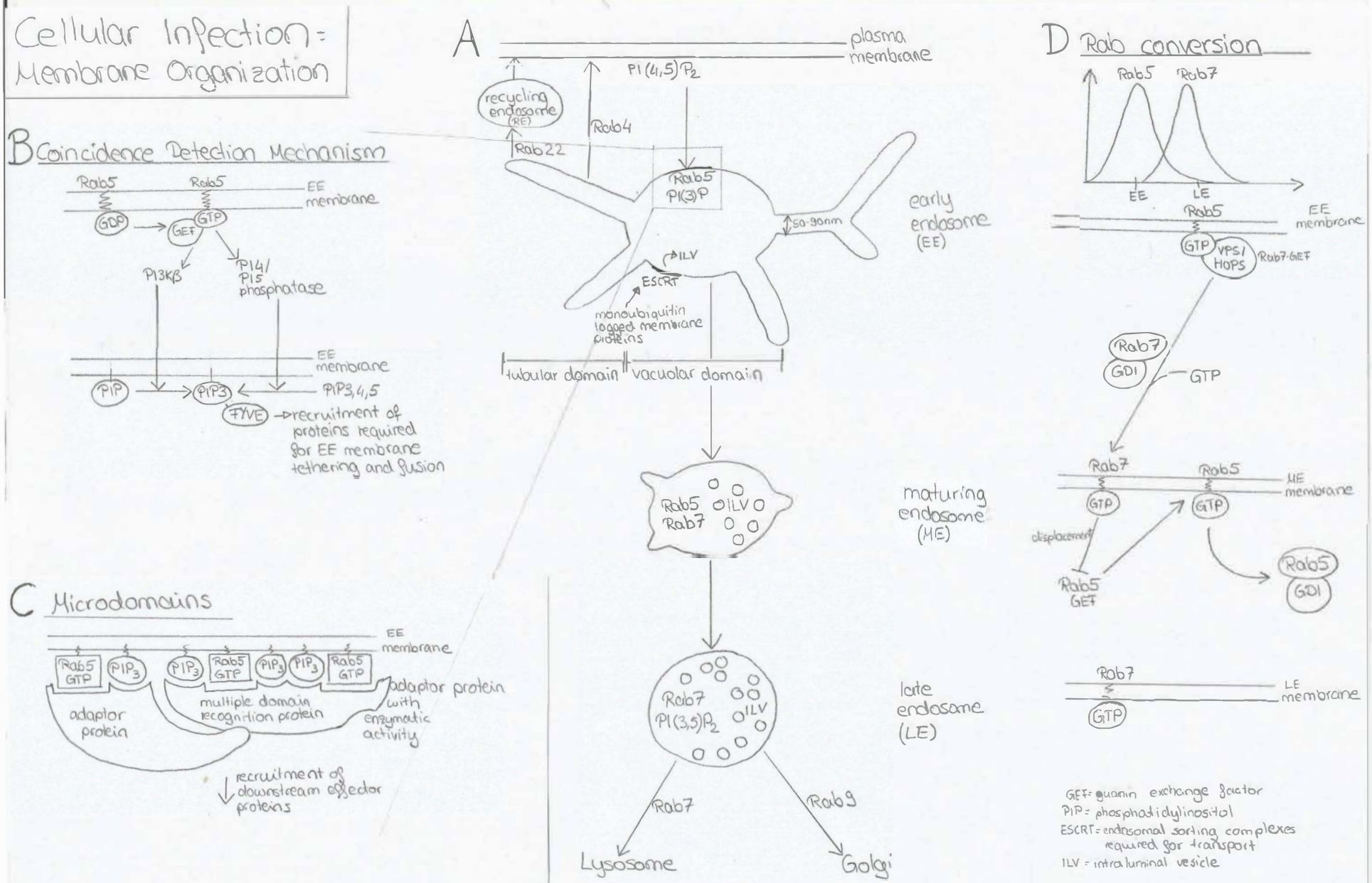
Cellular Infection: Membrane Organization



GEF = guanin exchange factor
PIP = phosphatidylinositol
ESCRT = endosomal sorting complexes required for transport
ILV = intraluminal vesicle

Source = Script Cellular Infection

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A. General overview of endosomal maturation. Early endosomal membranes are characterised by Rab5 and PI3P, whereas late endosomal membranes are characterized by Rab7 and PI(3,5)P2. The maturing endosomal membrane marks the transition from Rab5 to Rab7.

B. Coincidence detection mechanism. Activated Rab5 and PI3Kinaseβ and PI4/5Phosphatase are rectuited to the membrane, generating a PI3P and Rab5GTP rich membrane .

C. Microdomains. Multi-domain binding proteins that recognise PI3P and/or Rab5-GTP bind and concentrate these molecules by multiple binding interactions. Linkage of multiple domain binding proteins further stabilises the recruitment and leads to the formation of microdomains. Multi-domain binding proteins can either function solely as adapters, or can also display enzymatic activity. The latter can either stabilise the microdomain by positive feedback, or destabilise the complex by GAP activity for Rab5.

D. Rab conversion. The transition from early endosome to late endosome is marked by the transition from Rab5 to Rab7. Endosomal membrane bound Rab5-GTP can recruit effector proteins that inhibit or displace Rab5-GEF and display a Rab7-GEF activity. When a certain threshold is reached, there is a rapid conversion form Rab5 to Rab7 which catalyses itself.