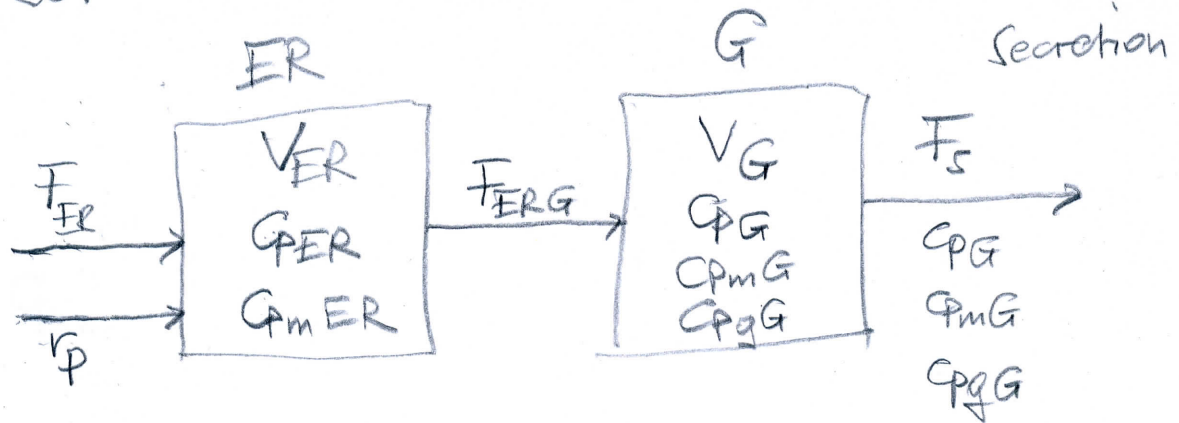


9.4.2

## Exercise 9.4.2

Scheme with two compartments



ER - endoplasmic reticulum

G - Golgi apparatus

P - raw protein

$P_m$  - mature protein

$P_g$  - glycosylated protein

9.4.3

## Exercise 9.4.3

### Streams

$F_{ER}$  - volumetric flow rate creating new ER

$F_{ERG}$  - vesicle flow rate from ER to G

$F_S$  - secretion flow rate

$F_{ER} \cdot C_{pin} = r_p$  - total protein synthesis rate

$C_{pin}$  - hypothetical protein concentration feeding to the ER

At steady-state:  $F_{ER} = F_{ERG} = F_S$

Streams are added already in solution to Exercise 9.4.2

9.4.4

# Exercise 9.4.4

$$r_p = f(C_s)$$

e.g.

$$r_p = r_{pm} \cdot \frac{C_s}{K_s + C_s}$$

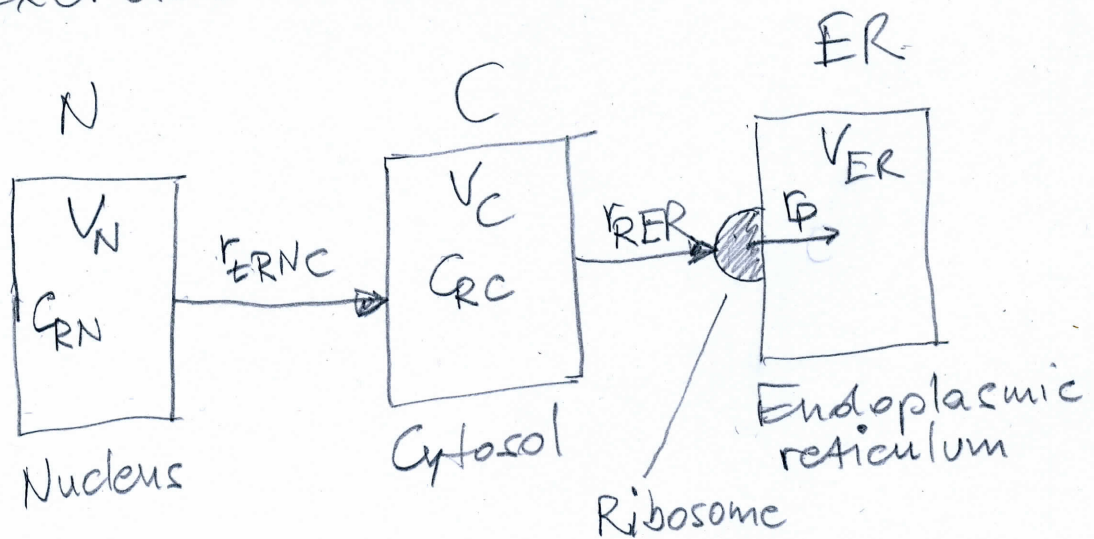
multiple substrates, e.g. all  
aminoacyl tRNAs,  $C_{si}$

$$r_p = r_{pm} \cdot \prod \frac{C_{si}}{K_{si} + C_{si}}$$

Monod type kinetics

9.4.5

# Exercise 9.4.5



$$V_N \frac{dC_{RN}}{dt} = r_{RN} \cdot V_N - r_{ERNC}$$

$r_{RN}$  — rate of synthesis of mRNA in the nucleus

$r_{ERNC}$  — rate of transport of mRNA from the nucleus to the cytosol

$r_{RER}$  — rate of binding of mRNA to ribosome attached to the ER

$v_p$  — rate of protein synthesis