PURDUE UNIVERSITY

Weldon School of Biomedical Engineering

The Convergence of Differences, The Future of Excellence

BME 695N

Engineering Nanomedical Systems

Lecture 7

Normal & facilitated cell entry mechanisms

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I. Introduction

A. the general problem of cell entry

B. choosing modes of cell entry

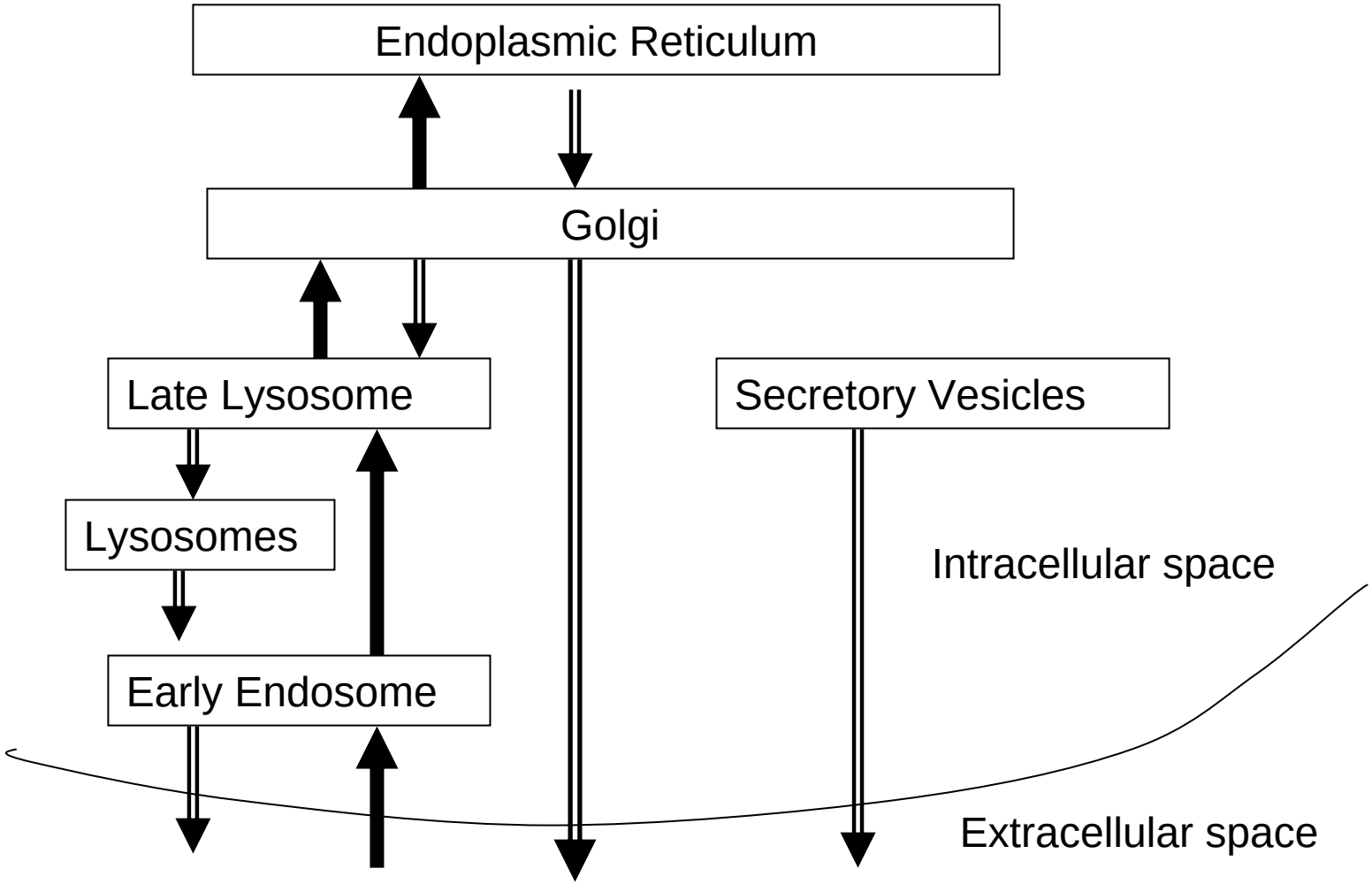
C. how does Nature do it? (biomimetics)

II. Non-specific uptake mechanisms

A. pinocytosis by all cells

B. phagocytosis by some cells

Dynamics of Transport Across the Cell Membrane



Adapted from Alberts et al., p. 746, 2002.

III. Receptor mediated uptake

A. Receptor mediated transport of desired molecules

B. Example- transferrin receptor transport of iron for metabolism

IV. Nanoparticle uptake

A. Size matters[1]

B. Agglomeration reduces uptake[2]

C. Charge matters – a future lecture on zeta potentials

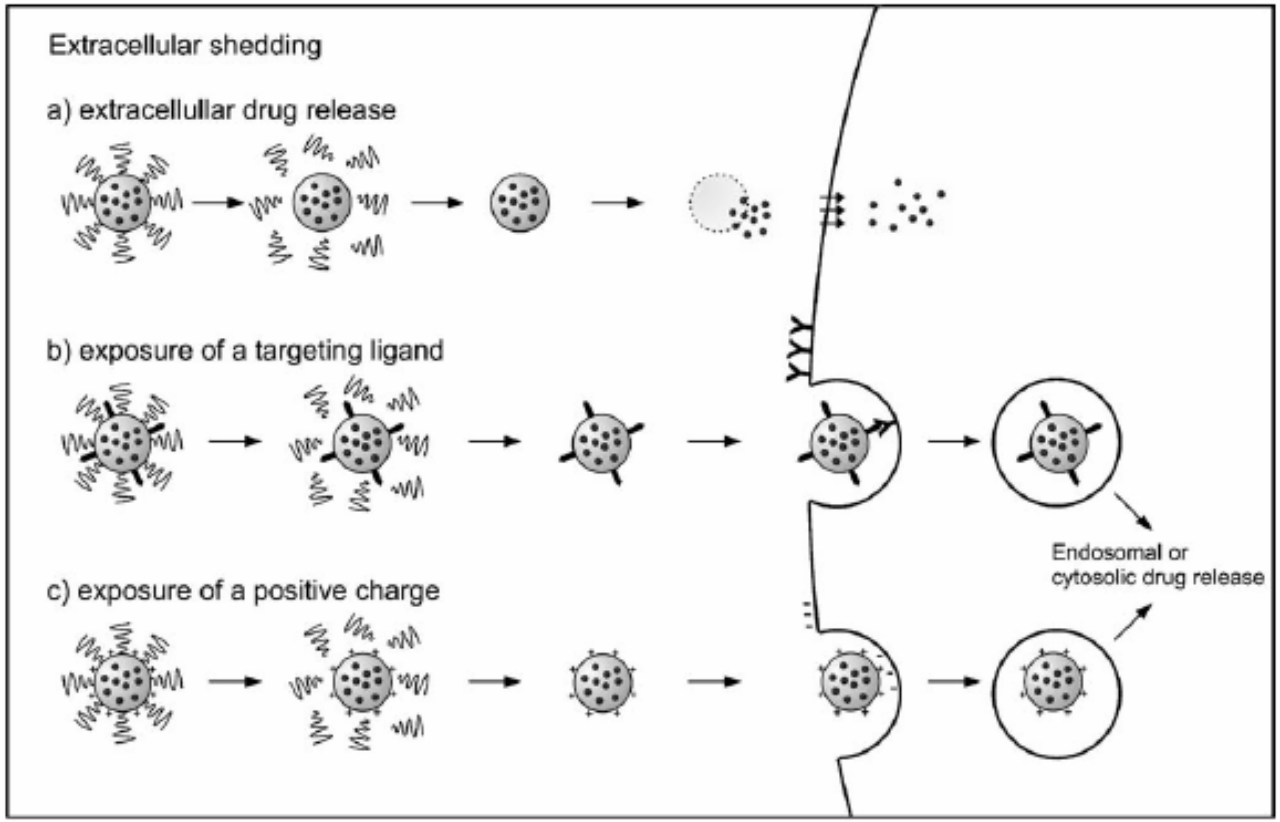
[1, 2] Limbach et al., 2005.

V. Drug delivery by "shedding"

A. Extracellular drug delivery by shedding

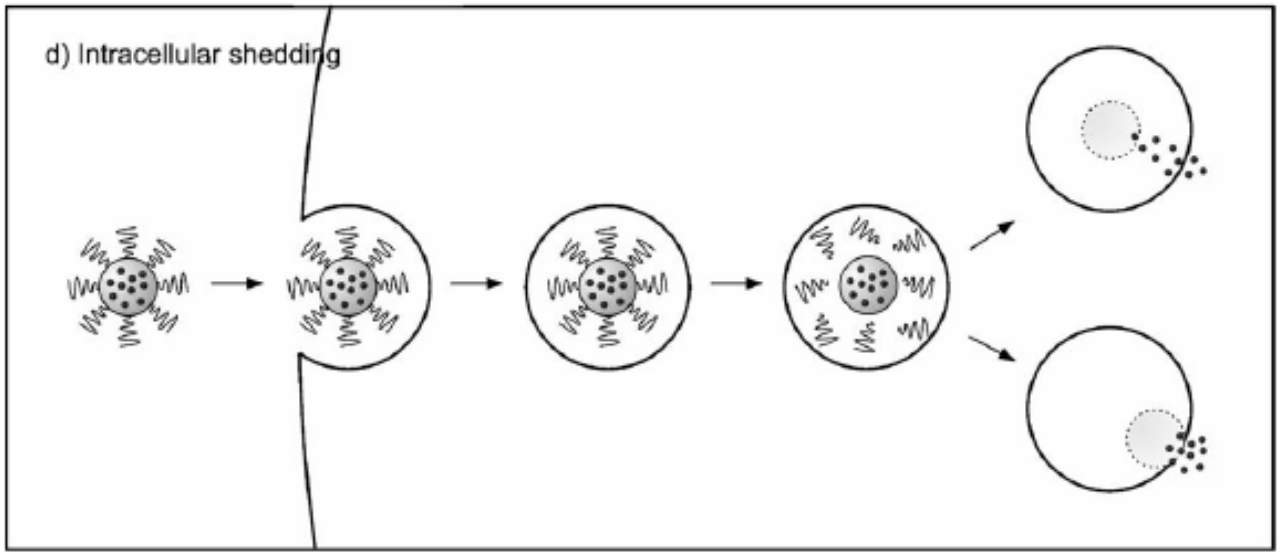
B. Intracellular drug release by shedding

Extracellular Drug Delivery by Shedding



Ref: Romberg et al. 2007.

Intracellular Drug Release by Shedding



Ref: Limbach et al. 2005.

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