

An electron micrograph of a cell, showing various organelles and structures. The image is in grayscale and has a grainy texture. The text is overlaid on the image.

**KITP Lecture**  
**August 19, 2015**

**How cells package and traffic  
proteins for export**

Randy Schekman

Department of Molecular and Cell Biology

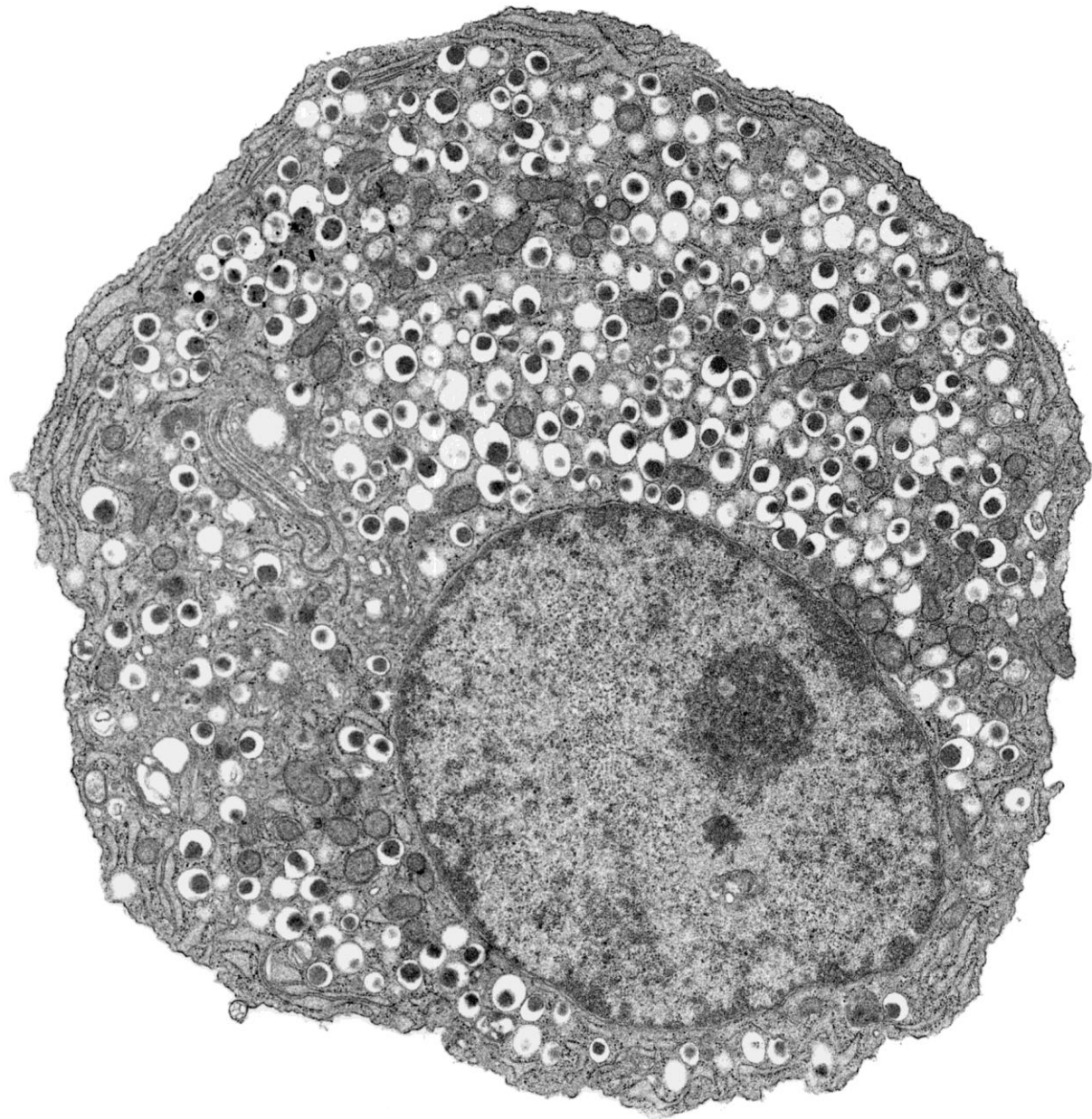
Howard Hughes Medical Institute

University of California, Berkeley



**Origins and  
influences**







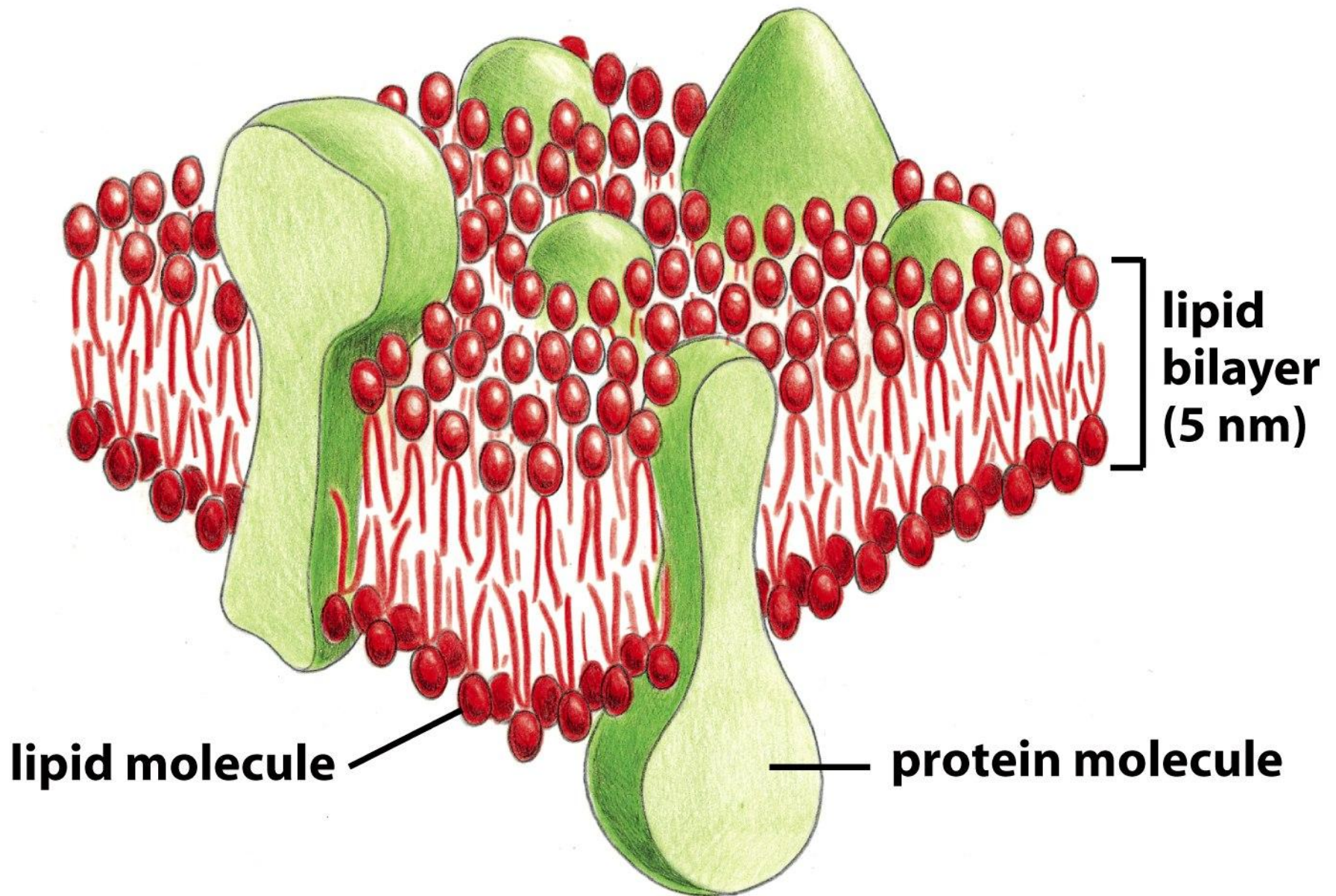


Figure 10-1c *Molecular Biology of the Cell* (© Garland Science 2008)



NEVER TURN CAM  
VALVE FROM P  
TO OPEN UNTIL  
LIGHT IS EXTING  
AND  
PVC GUAGE MUST  
BELOW 14 TO OPEN



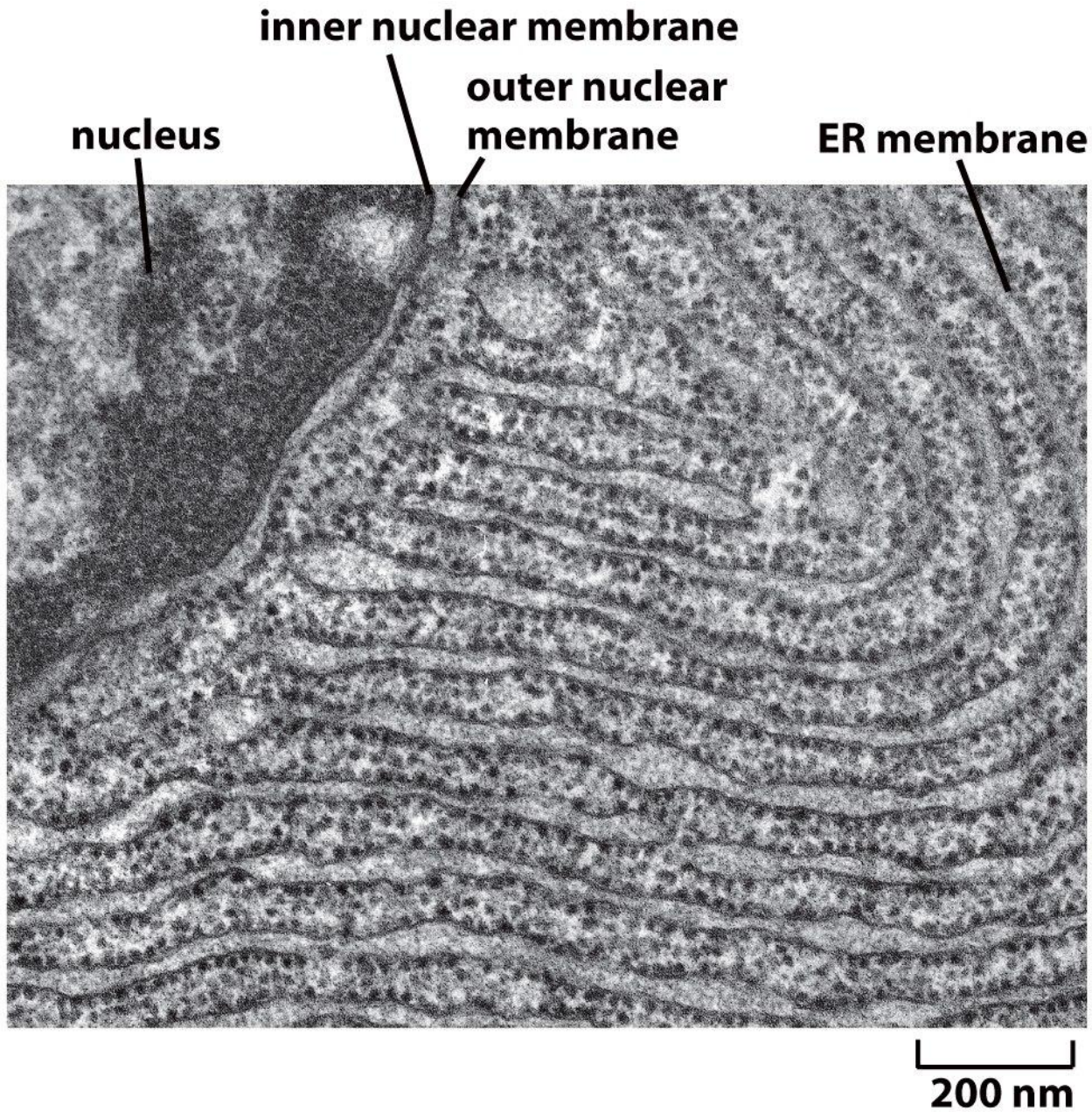


Figure 12-36a *Molecular Biology of the Cell* (© Garland Science 2008)

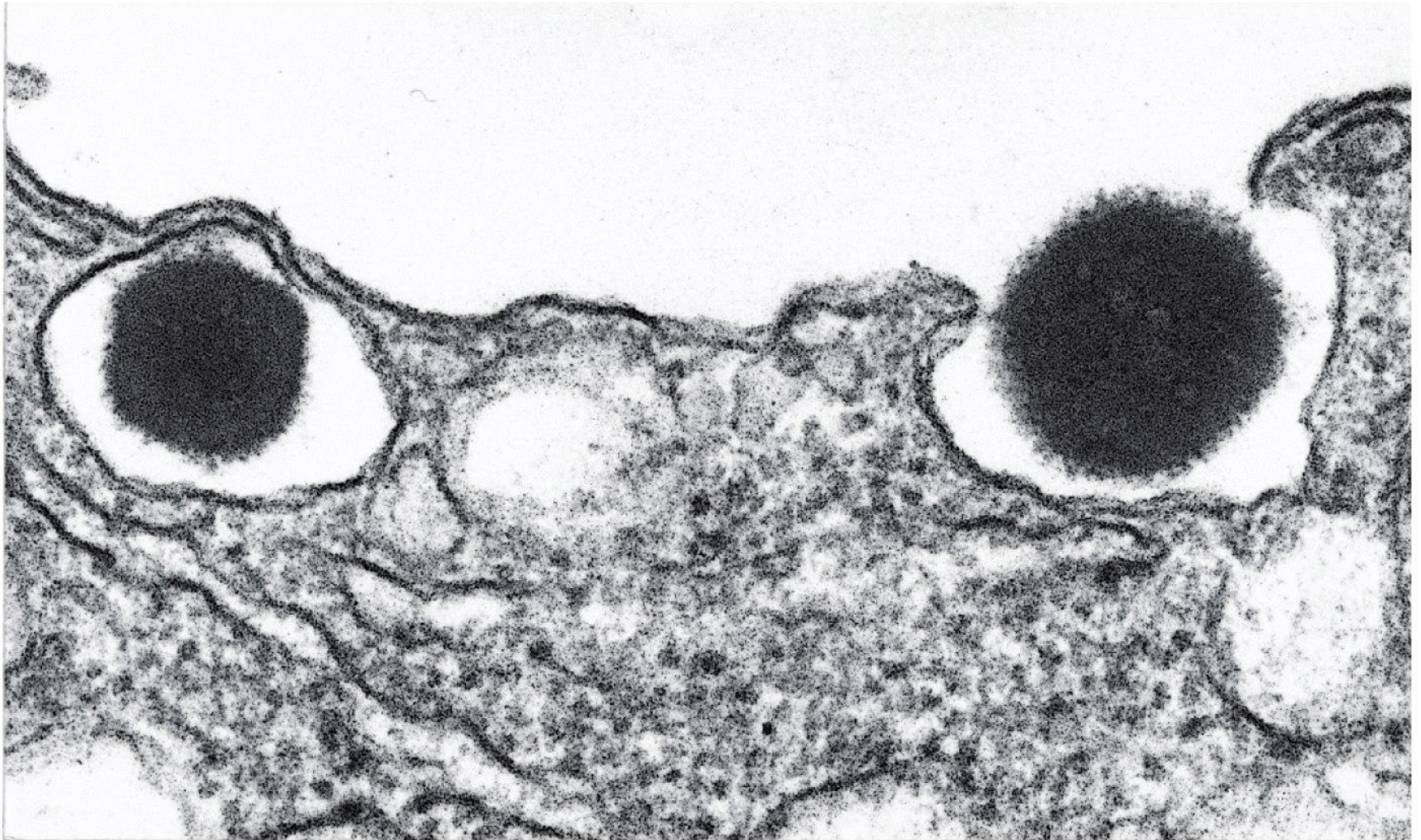


***cis* Golgi network**



**200 nm**



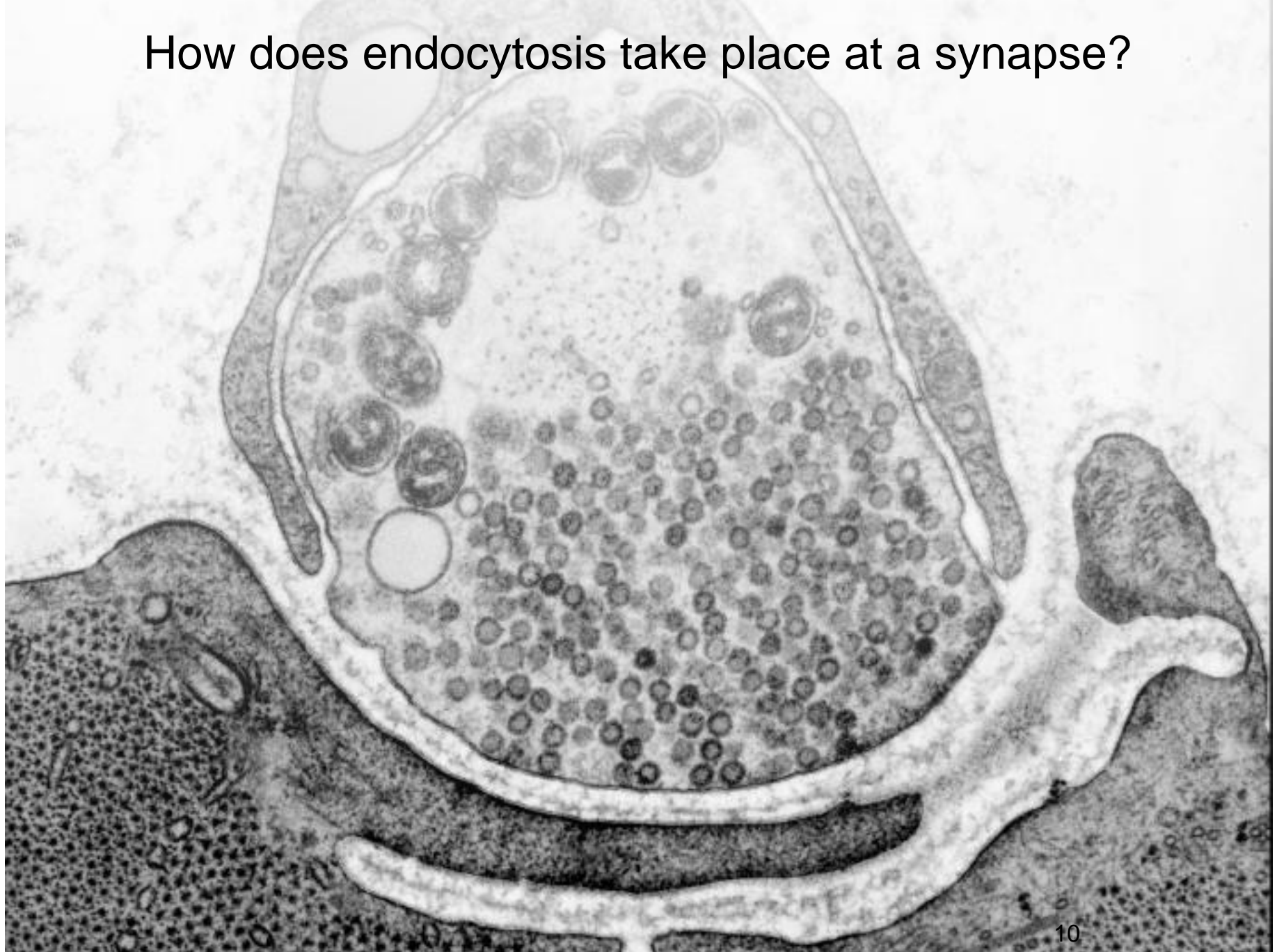


0.2  $\mu\text{m}$

Figure 13-66b *Molecular Biology of the Cell* (© Garland Science 2008)



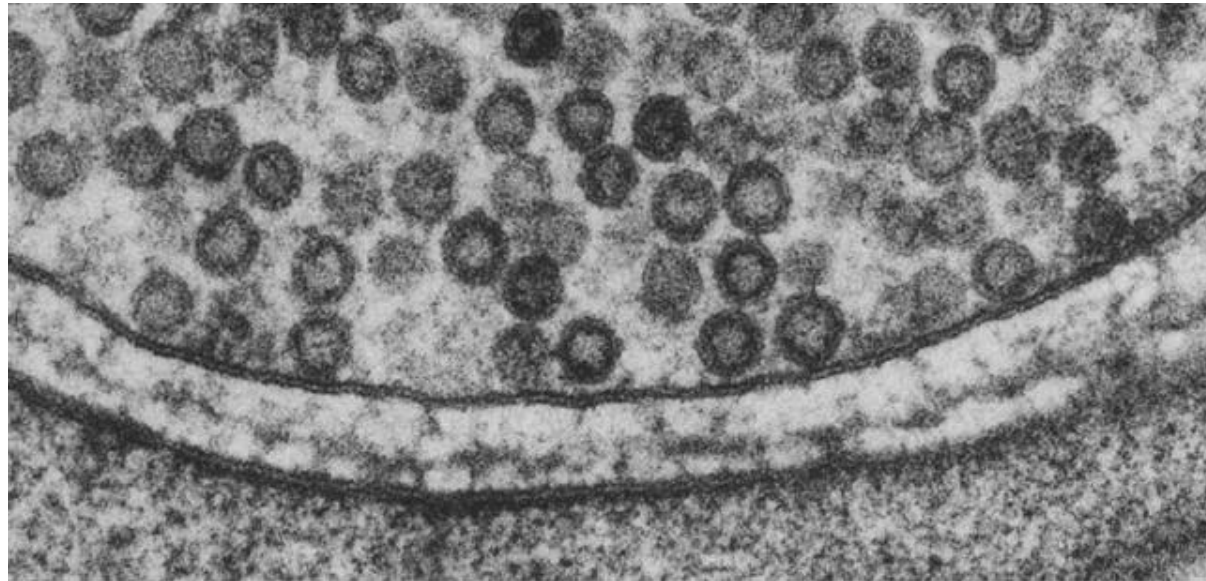
How does endocytosis take place at a synapse?



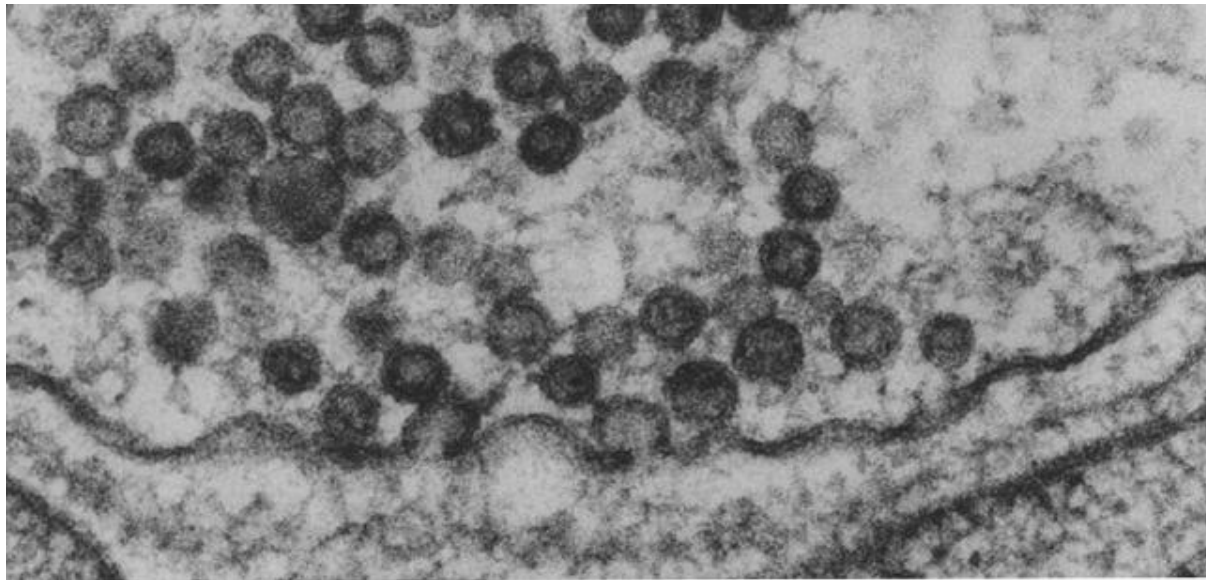


# Synaptic vesicles fuse with the plasma membrane

0 msec



5 msec



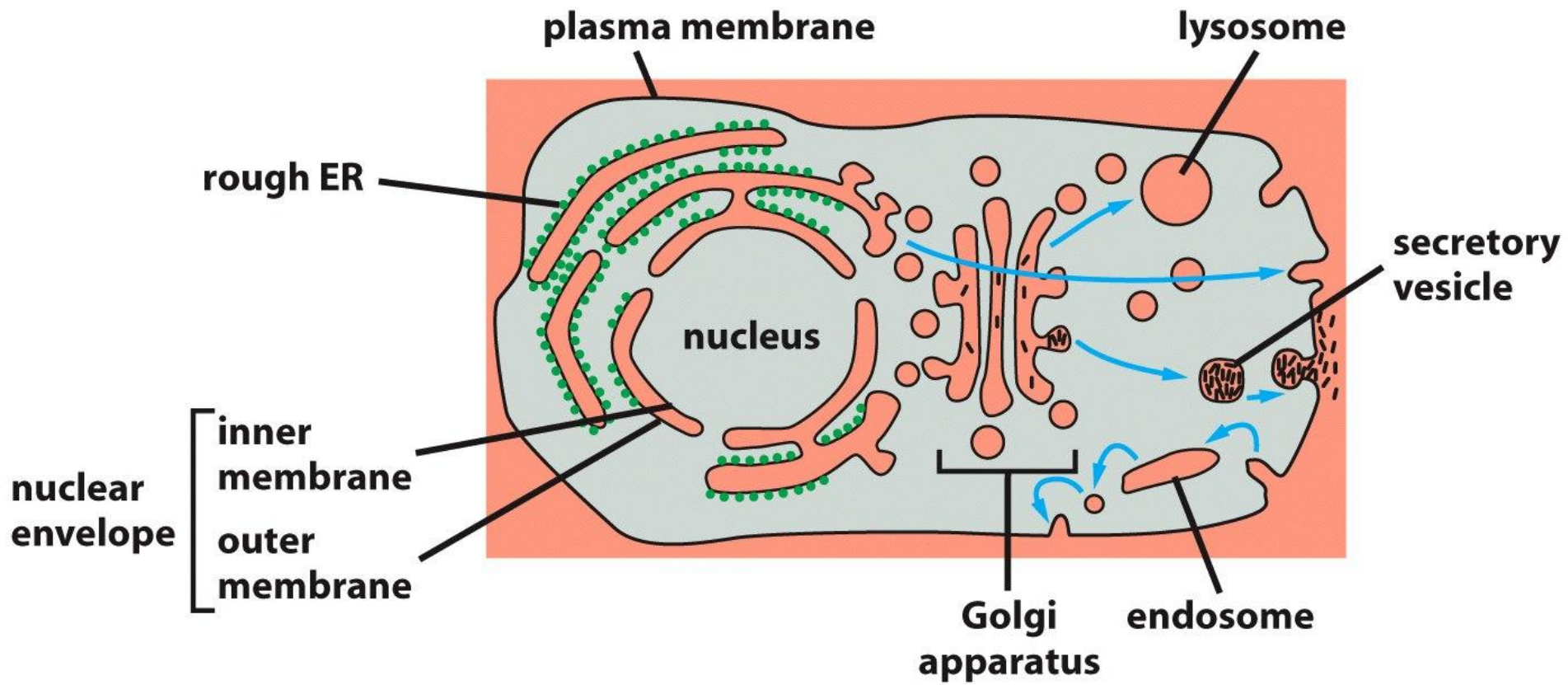
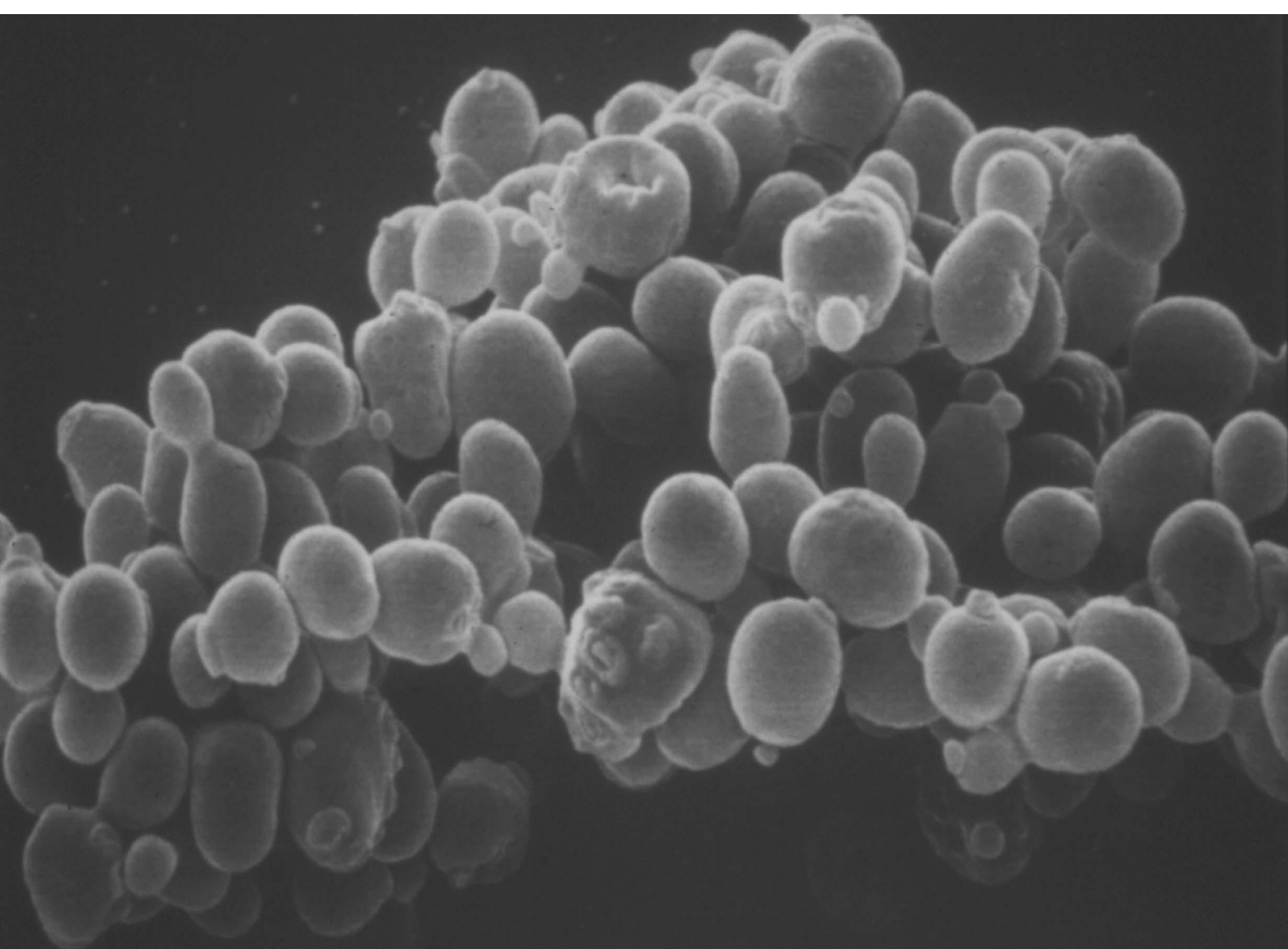


Figure 12-5 *Molecular Biology of the Cell* (© Garland Science 2008)



Berkeley, 1976







1.0  $\mu$ m

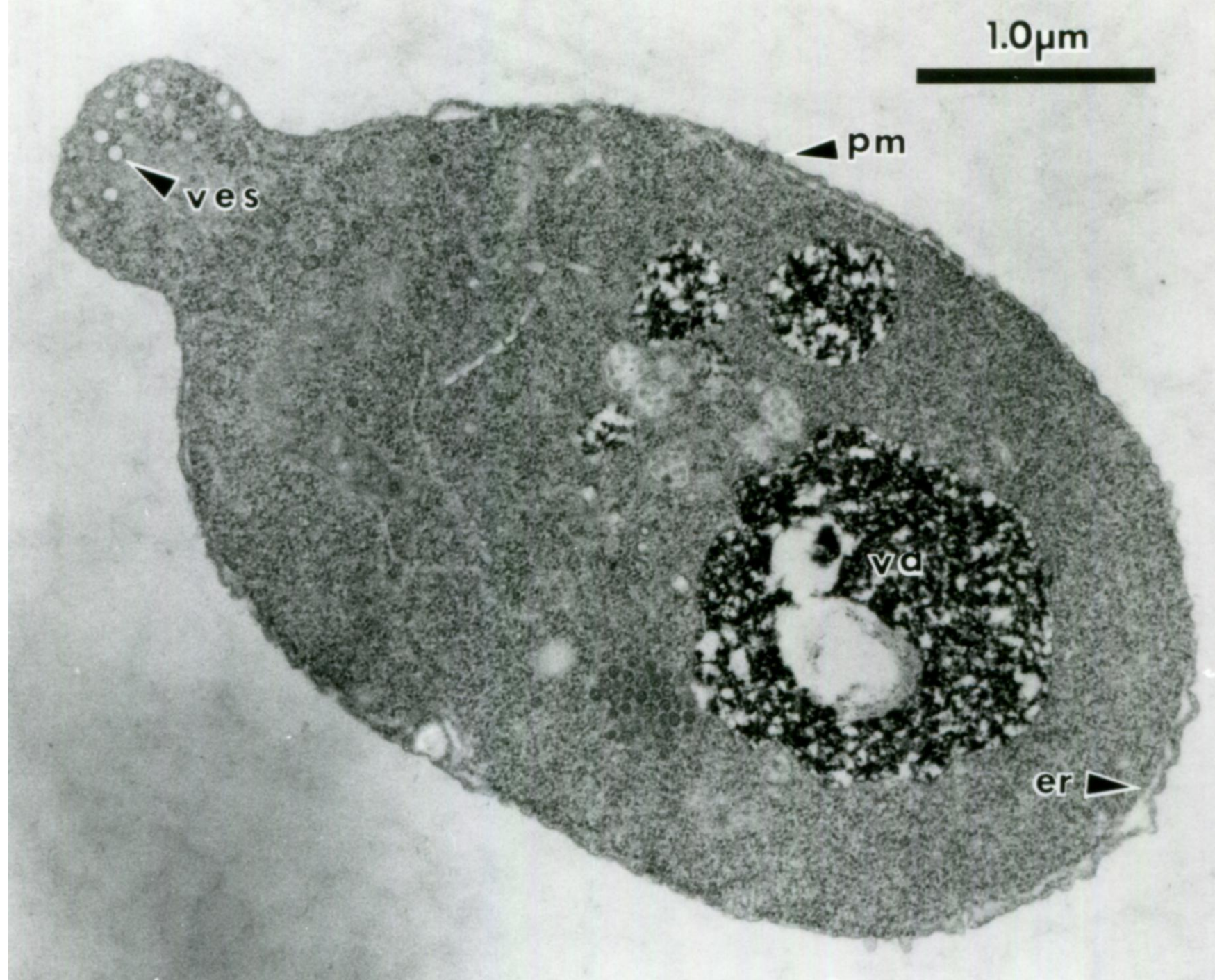


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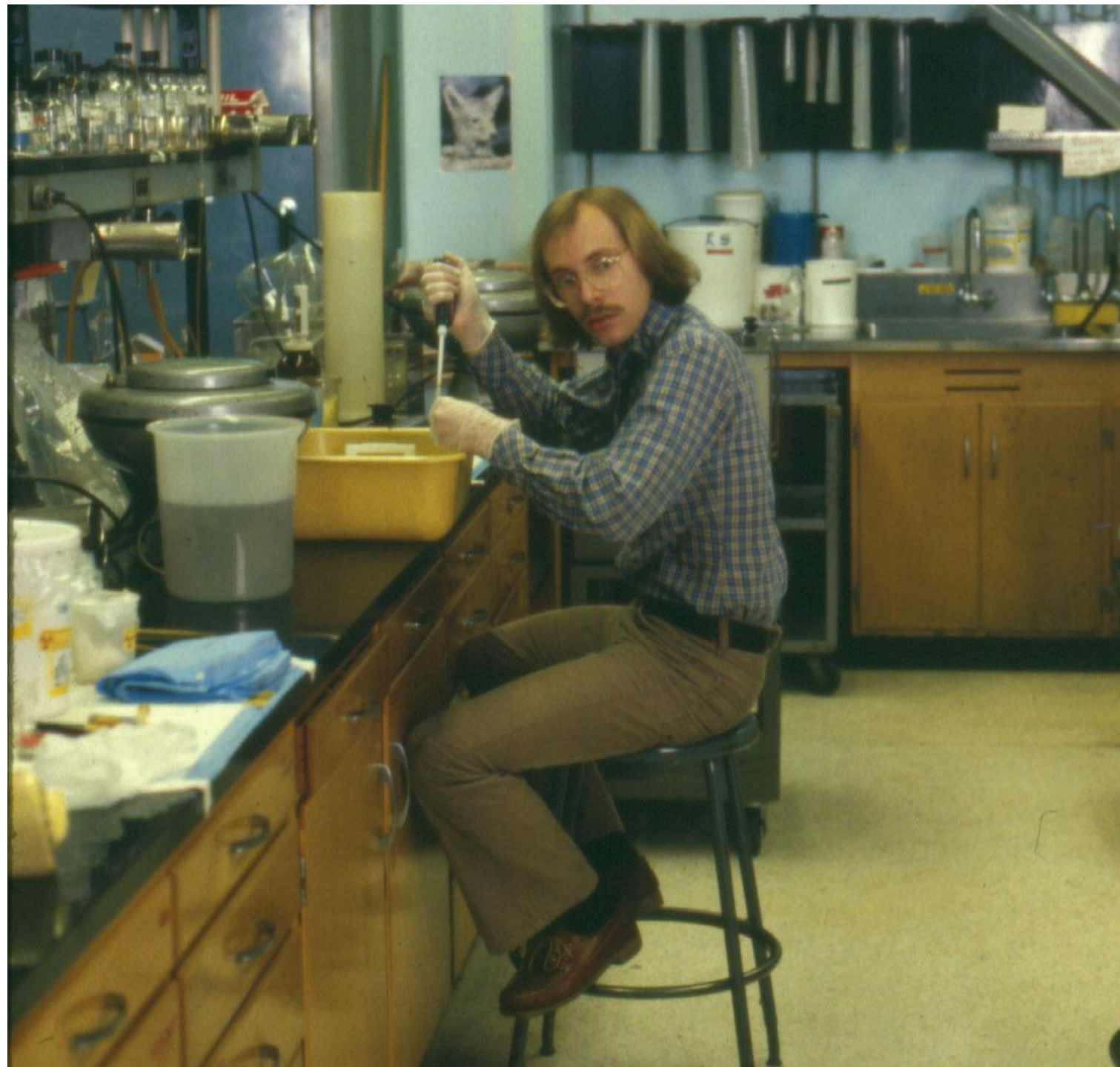
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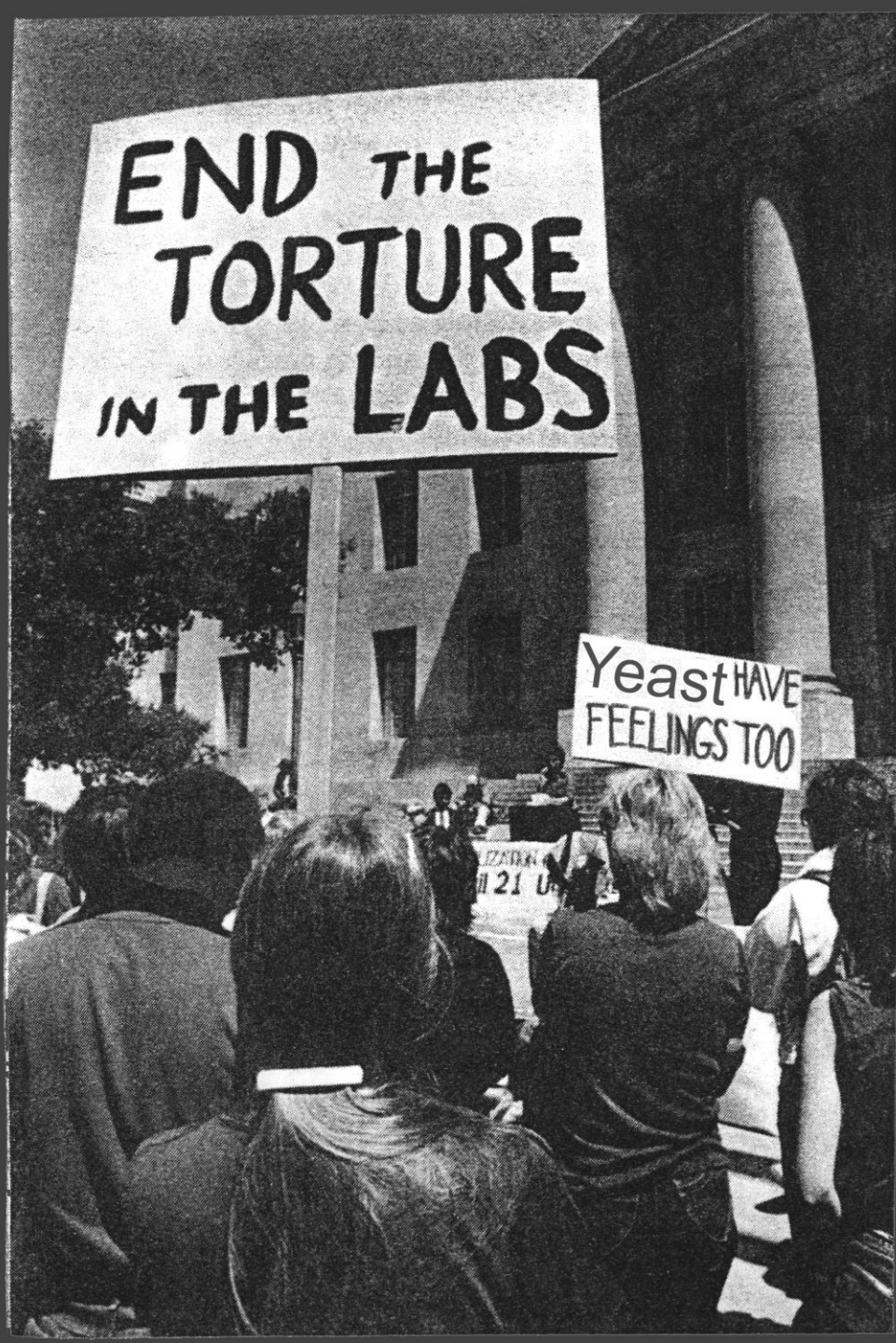


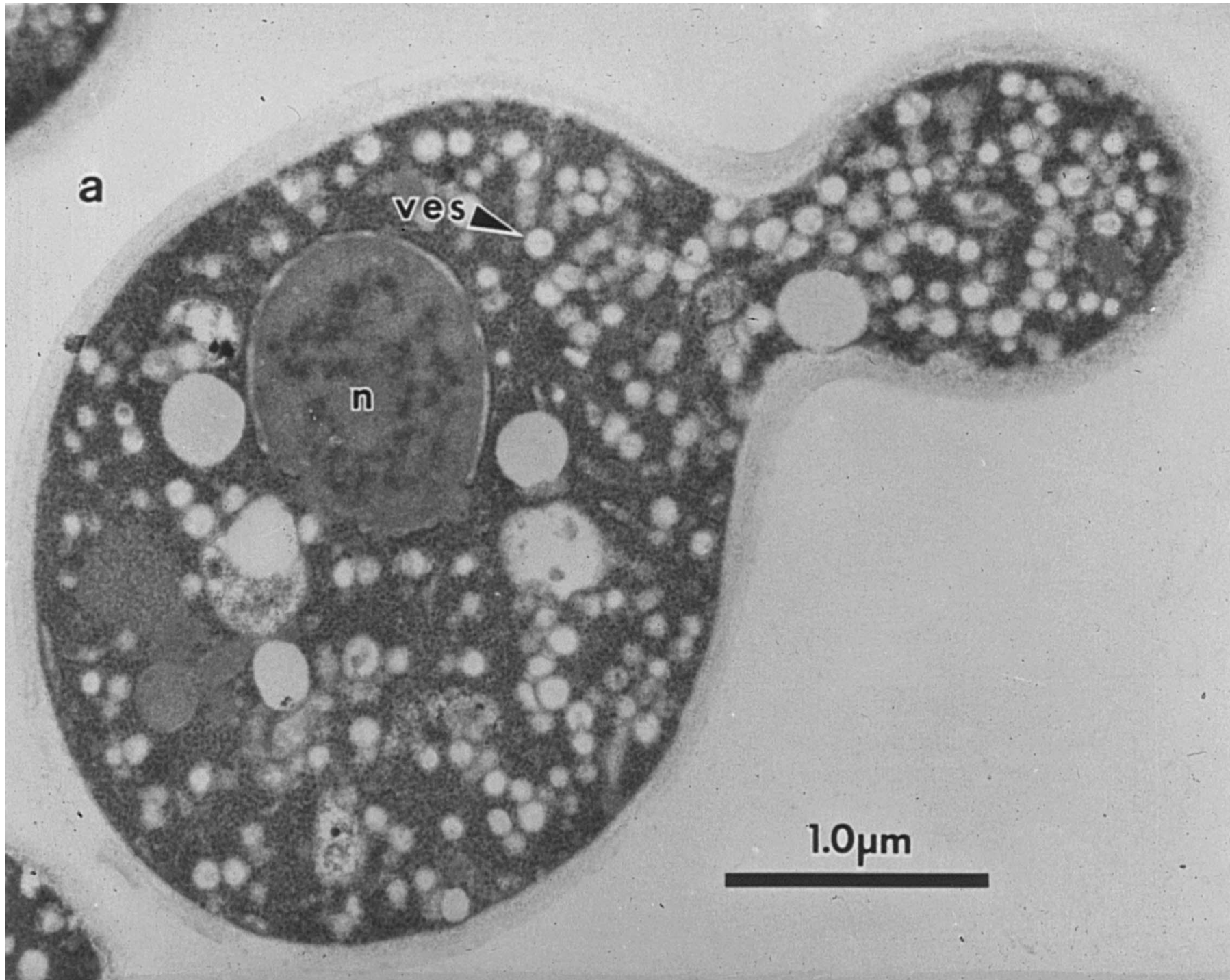


END THE  
TORTURE  
IN THE LABS

Yeast HAVE  
FEELINGS TOO

11 21 U





a

ves

n

1.0  $\mu$ m



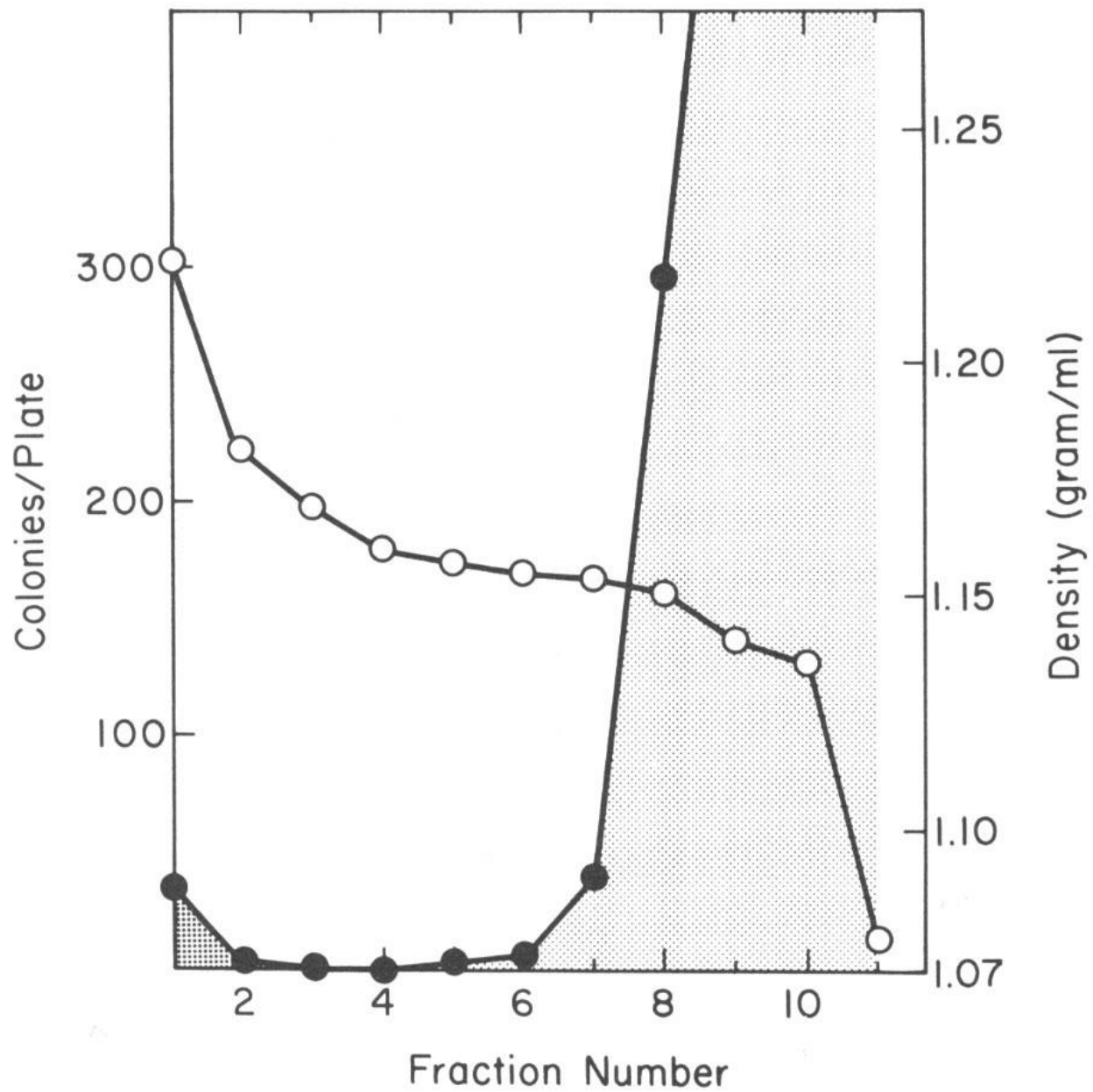
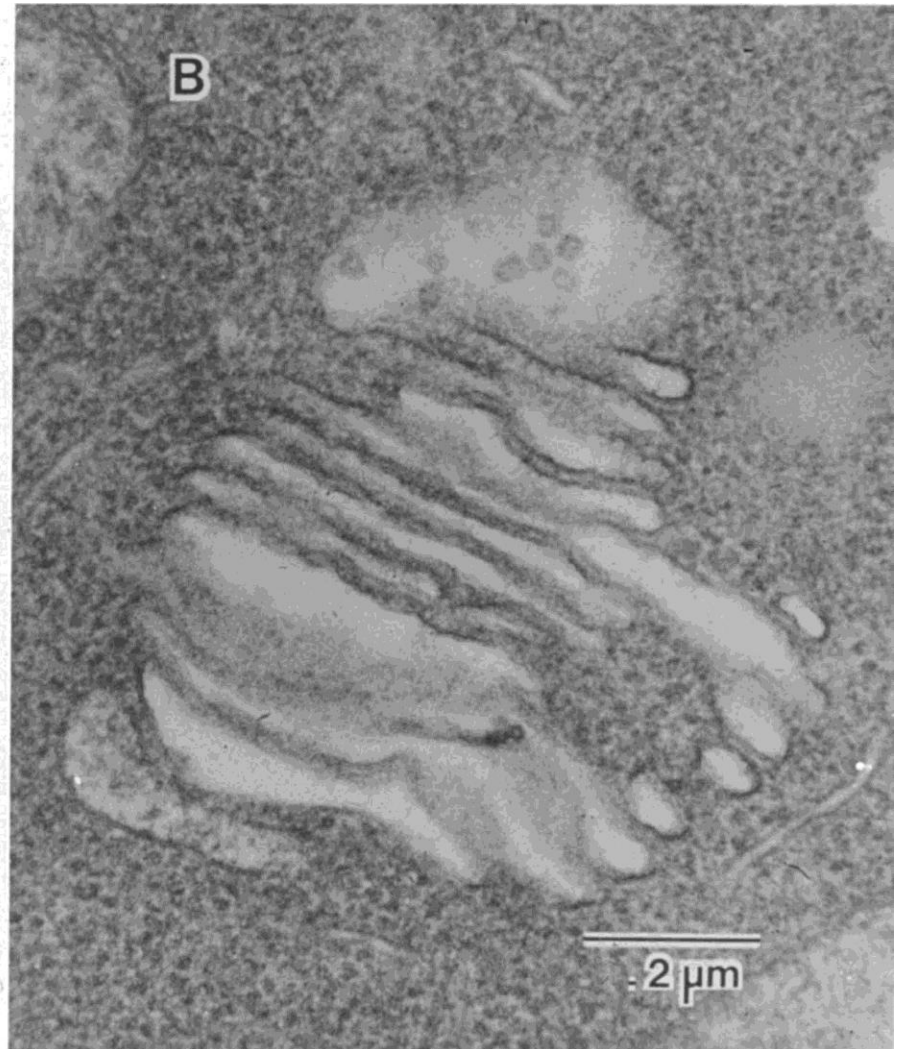
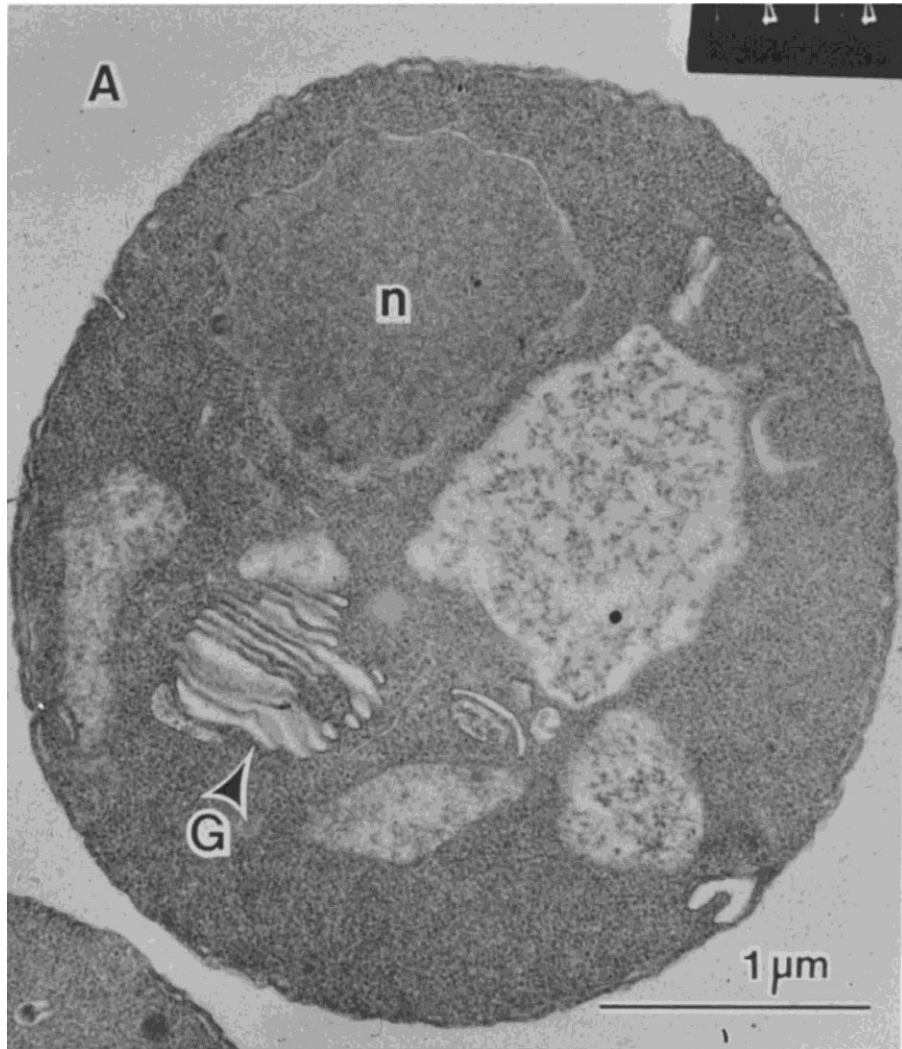
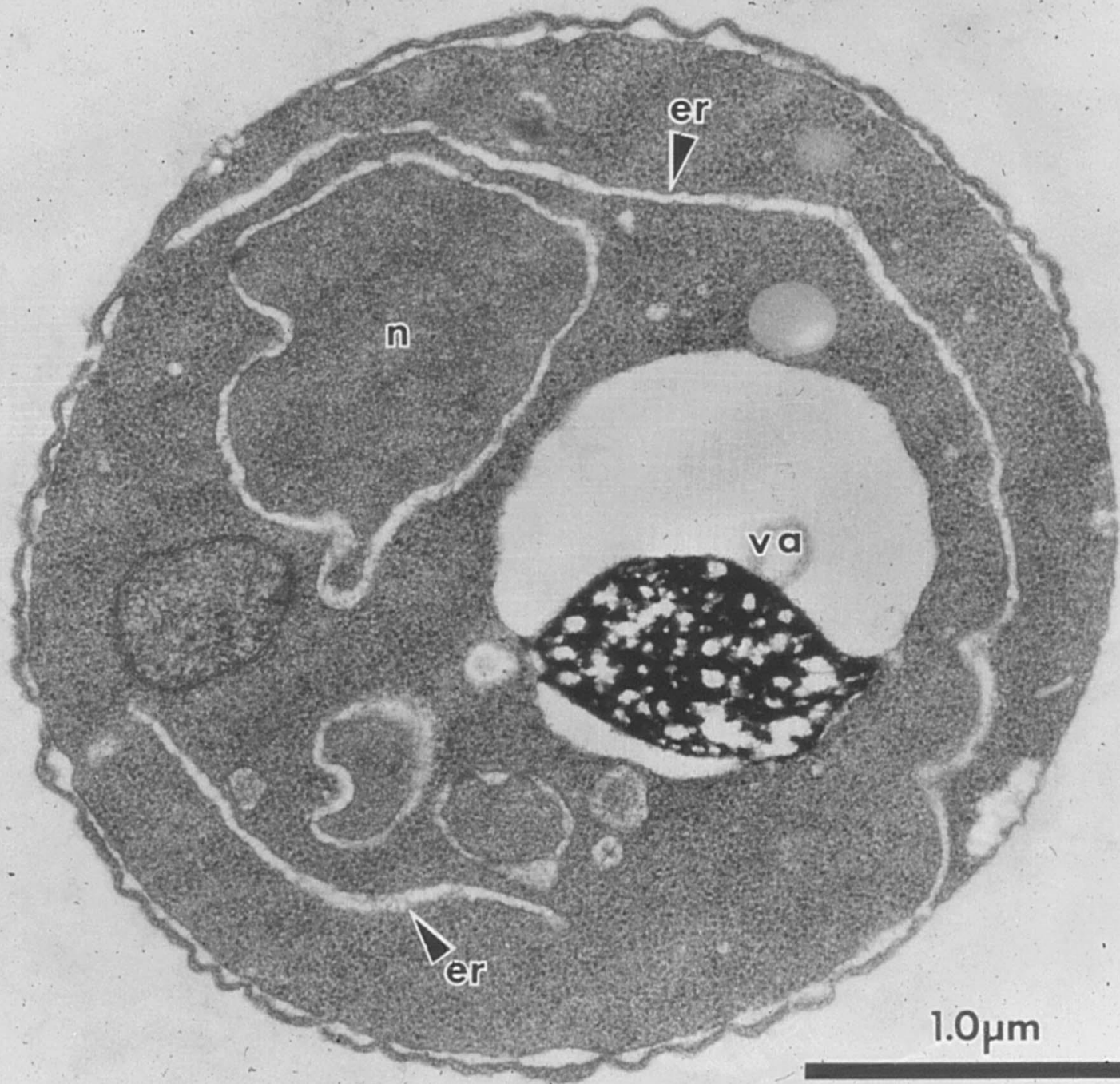


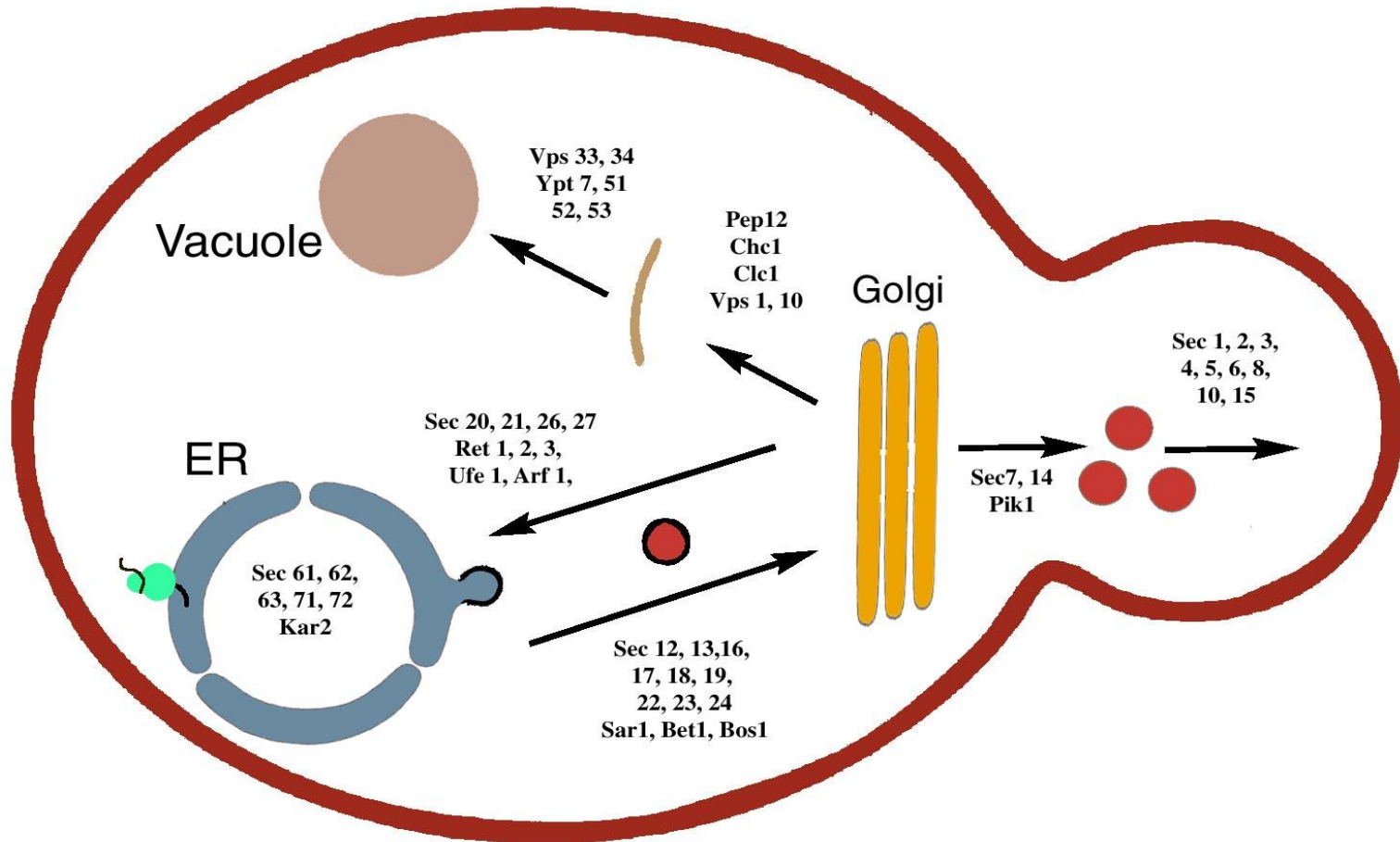
Figure 1. Density Gradient Separation of sec1-1 and X2180 Cells



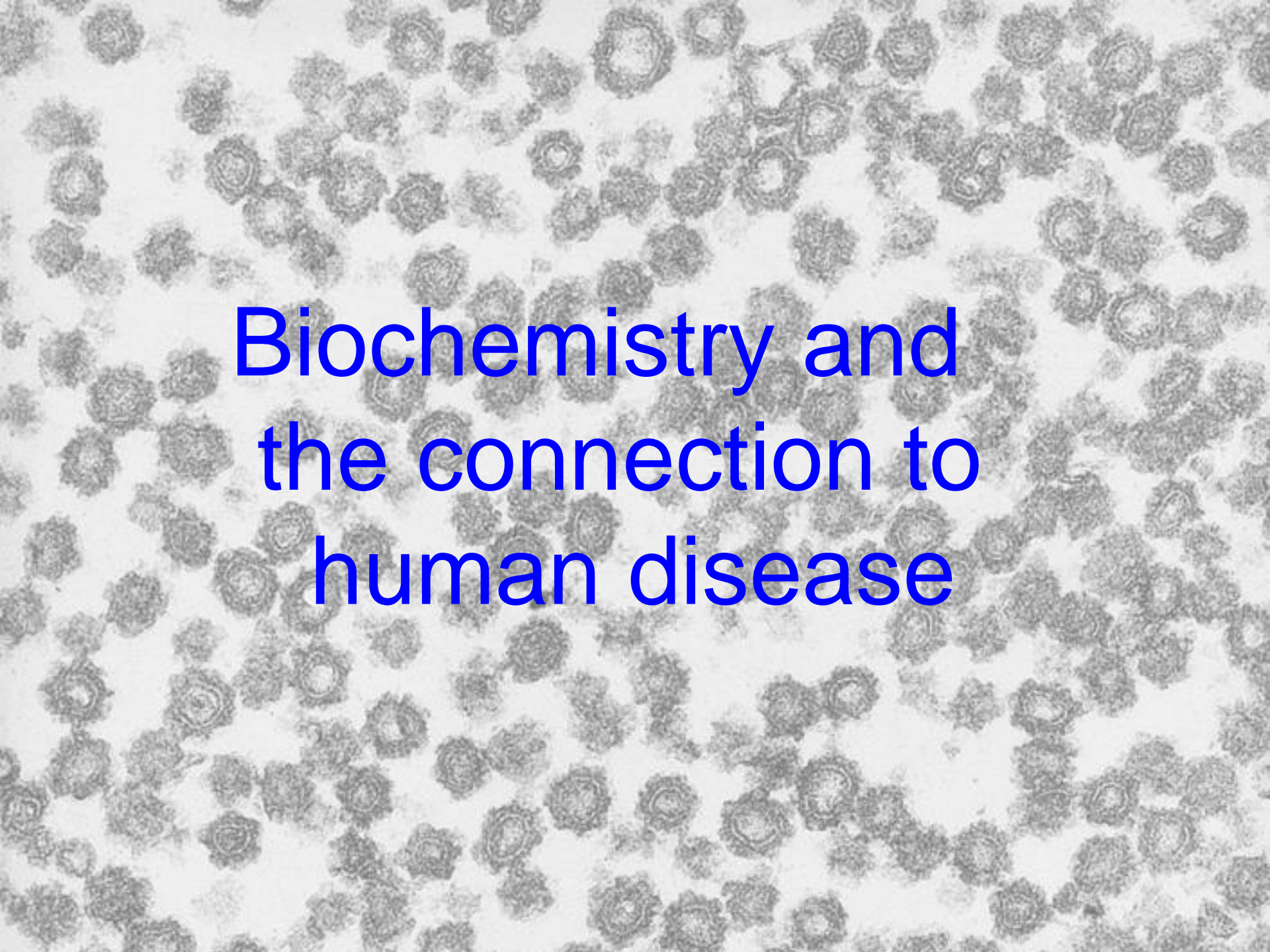




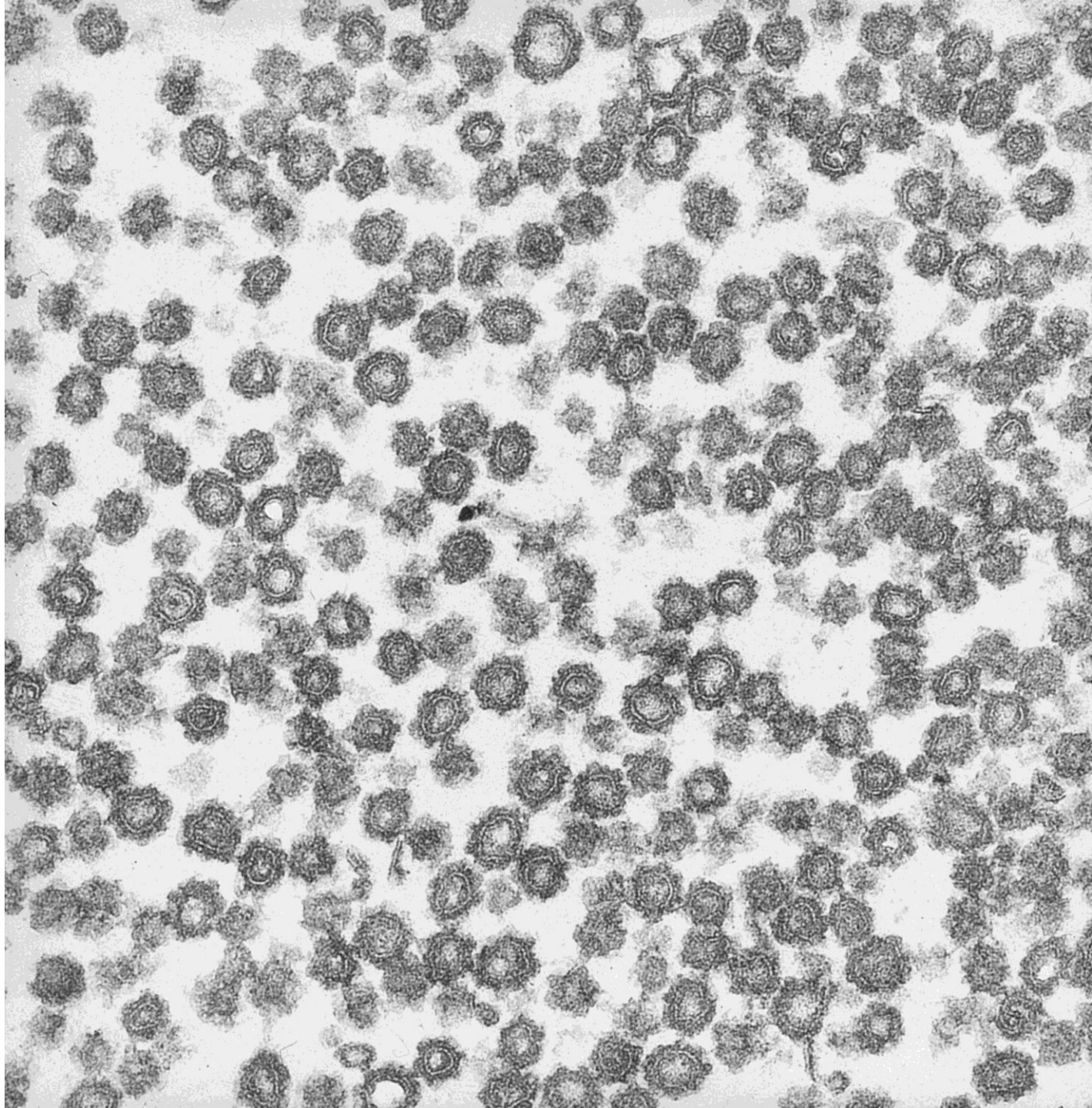
# Yeast secretory pathway



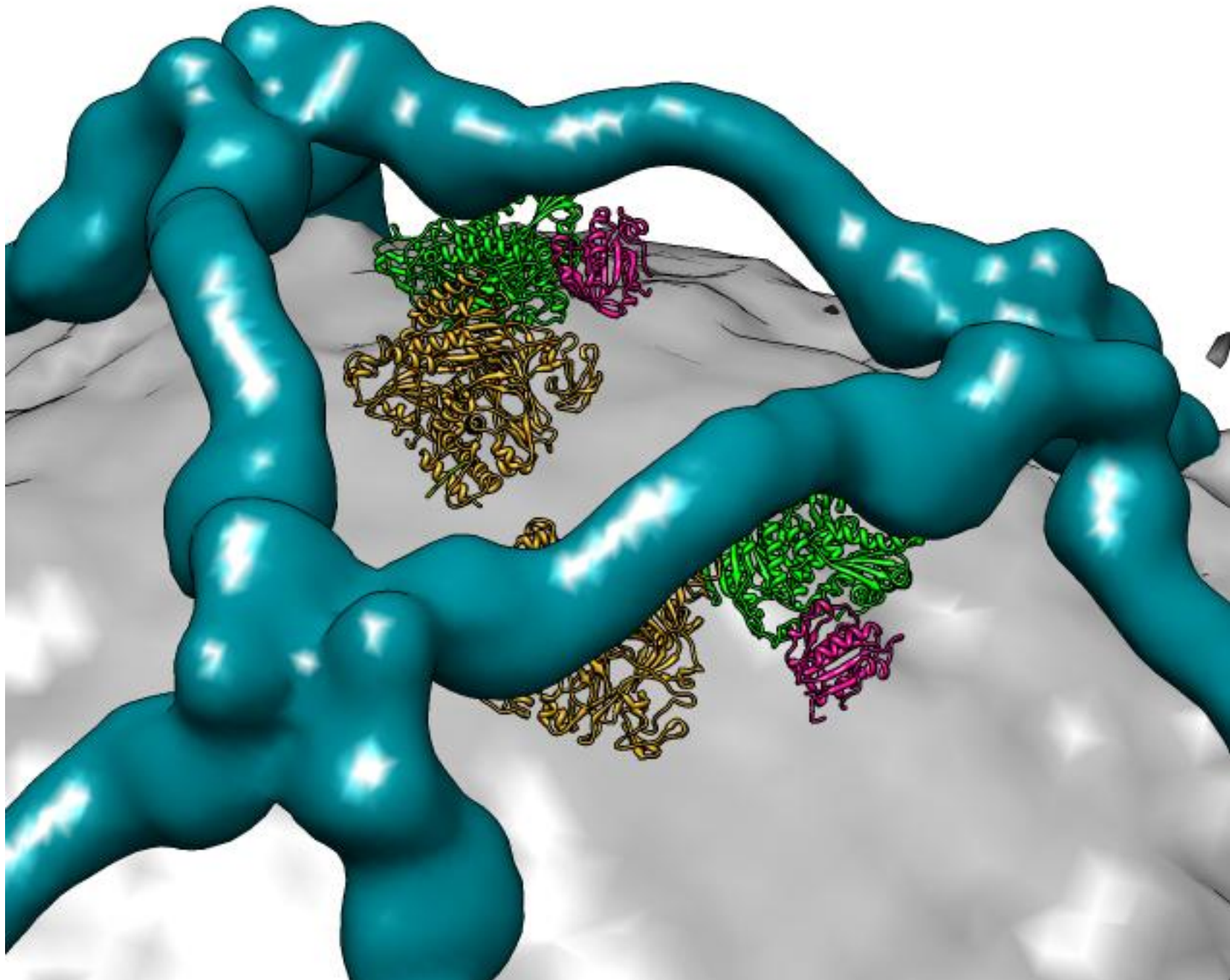




**Biochemistry and  
the connection to  
human disease**



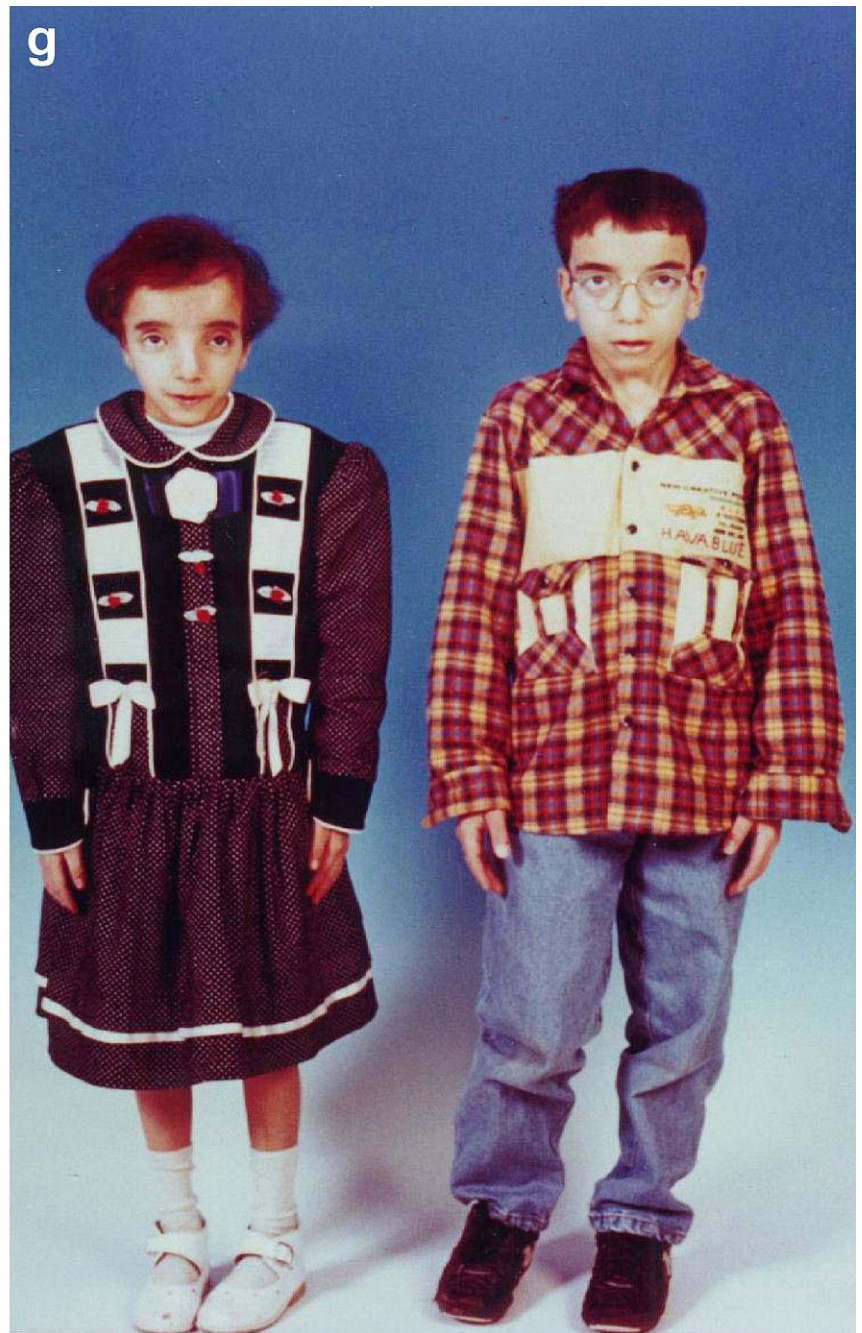
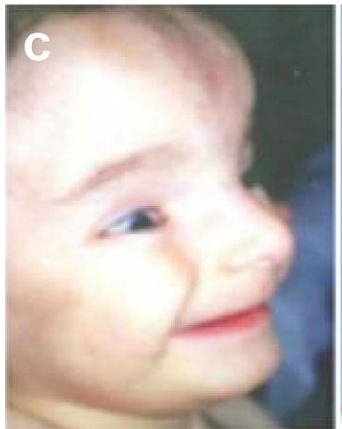




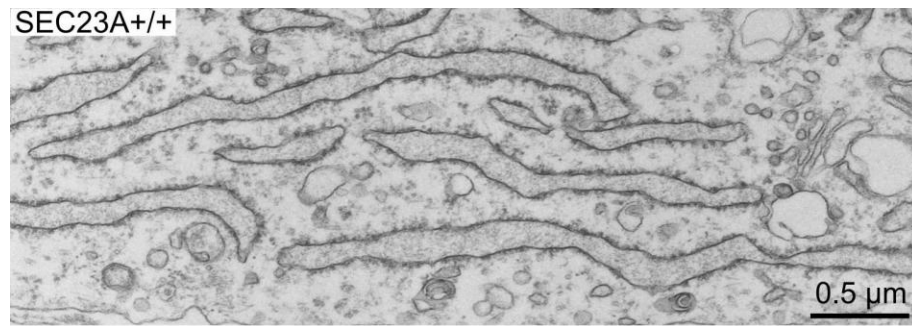
COPII gene duplication  
in mammals explains  
tissue-specific  
secretion diseases



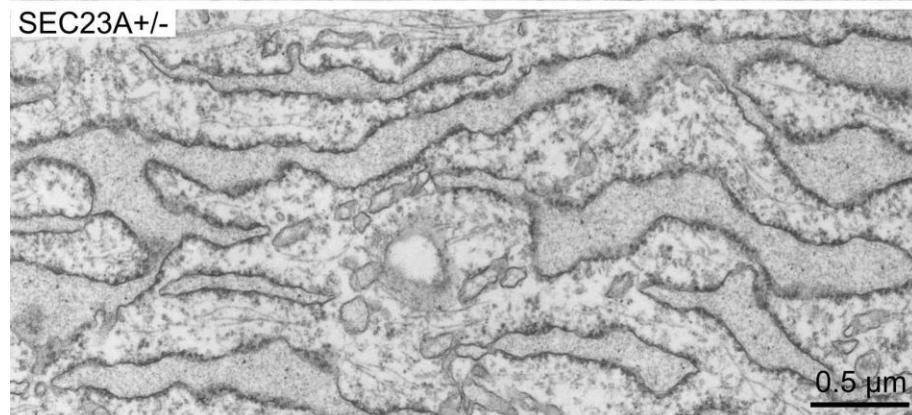




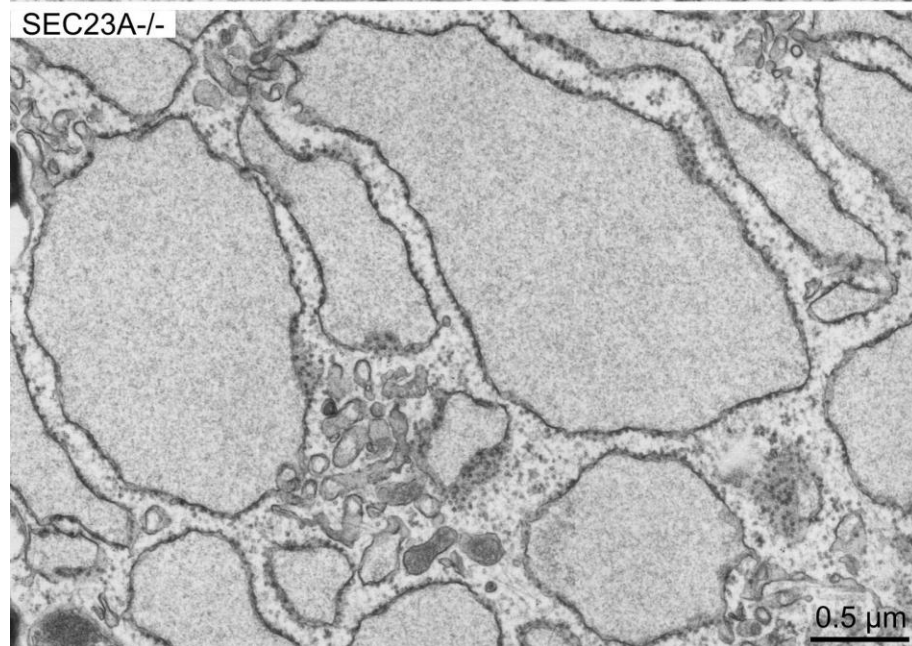
SEC23A<sup>+/+</sup>



SEC23A<sup>+/-</sup>



SEC23A<sup>-/-</sup>





# Major conclusions

1. Secretion and plasma membrane assembly are physically and functionally linked through a series of obligate organelle intermediates.
2. Polypeptide translocation and vesicular traffic machinery conserved over a billion years of evolution.
3. COPII coat sorts cargo molecules by recognition of transport signals and physically deforms the ER membrane to create budded vesicles.
4. Tissue specific expression of secretion machinery proteins explains several human diseases









# How does peer review work?





nature

42351\*

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The country's economic crisis is hitting researchers hard.

Alison Abbott

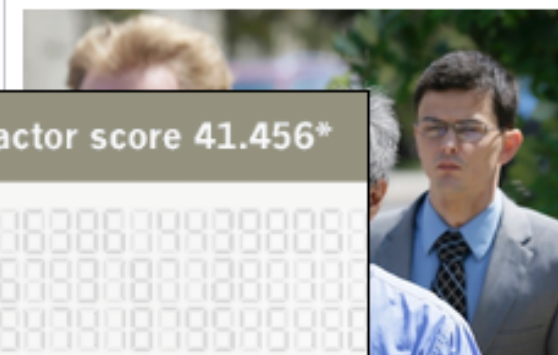
02 July 2015

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state bankruptcy, scientists are not expecting rescue funds to become available

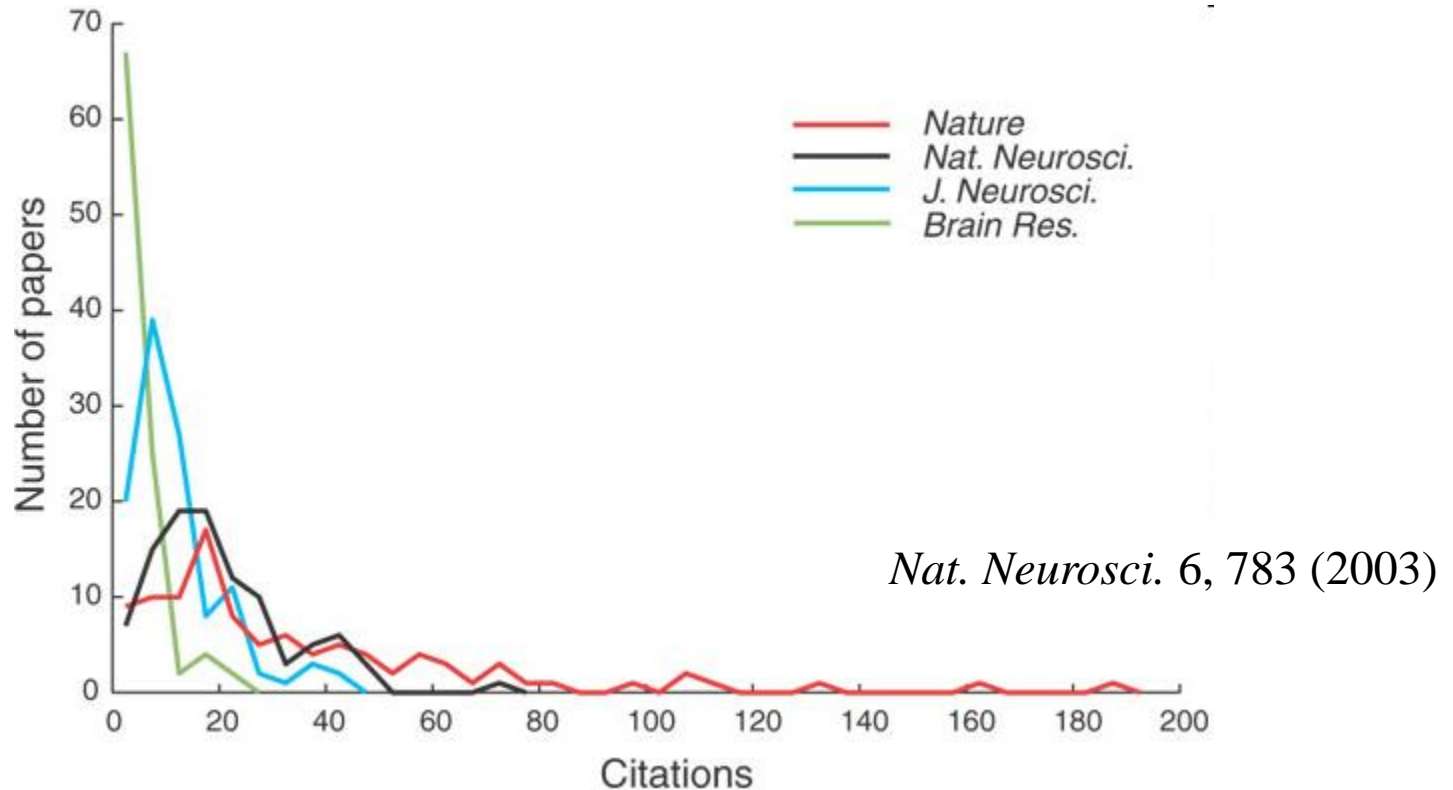


scientific events across the world





# Citation data are a blunt instrument, at best



In every case, the medians are far lower than the means, reinforcing the point that JIF is almost useless as a predictor of likely citations for an individual paper

# 中国科学院生物物理研究所

## 关于调整研究所科技绩效奖励方案的通知

所属研究组：

经所学术委员会研究，第九届所长第 15 次所务会讨论通过，决定对我所“科技绩效奖励”方案进行如下调整：

1、研究论文奖励等级分为：一等奖、二等奖和鼓励奖。奖励范围和金额如下：

奖励等级	奖励范围	单篇奖金
一等奖	《Cell》，《Nature》，《Science》	20 万元
二等奖	《PNAS》以上及相当	5 万元
鼓励奖	《生物化学与生物物理进展》、《生物物理学报》、《Protein Cell》	500 元

“PNAS 以上及相当”：原则上为当年  $IF \geq PNAS$  的期刊。特殊情况需重点实验室提交所学术委员会审议。

2、增加对联合培养学生发表论文的奖励。对于联合培养的研究生，科研工作在我所完成，以我所为共同的第一作者单位和通讯作者单位的研究成果（其中学生资格以单位签订的联合培养学生协议为依据）。

3、此方案从 2013 年起实施，2011 年发布的《研究所科技绩效奖励办法》（科生发科字[2011]46 号）中与此不一致部分同时废止，不再另行发文，科学与技术处负责解释。



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**—James Watson**, of double-helix fame, speaking  
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