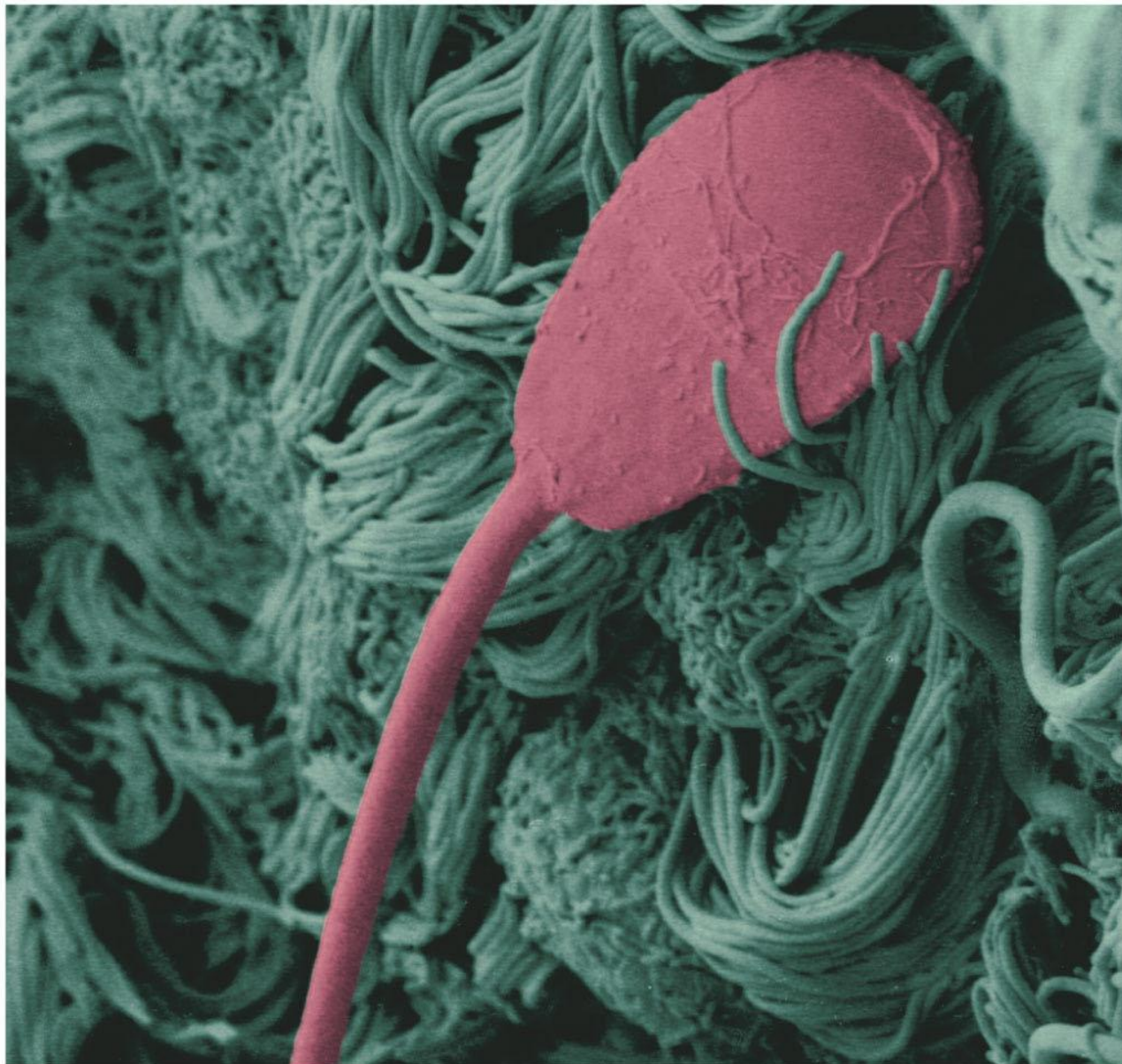
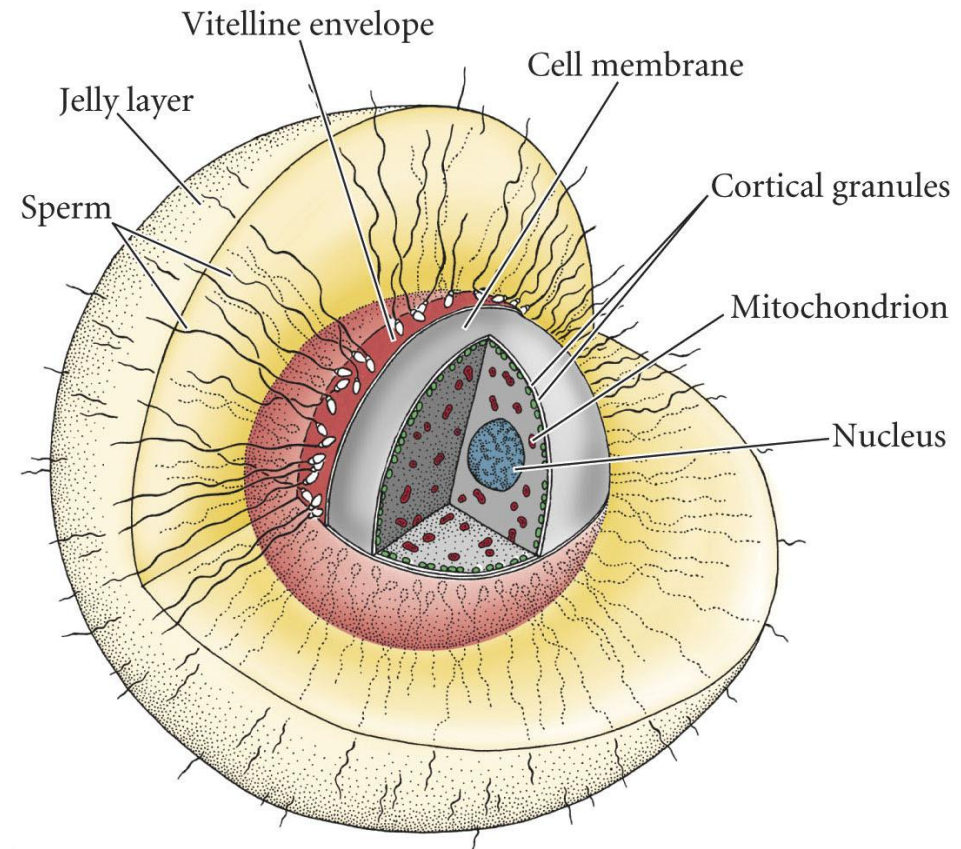
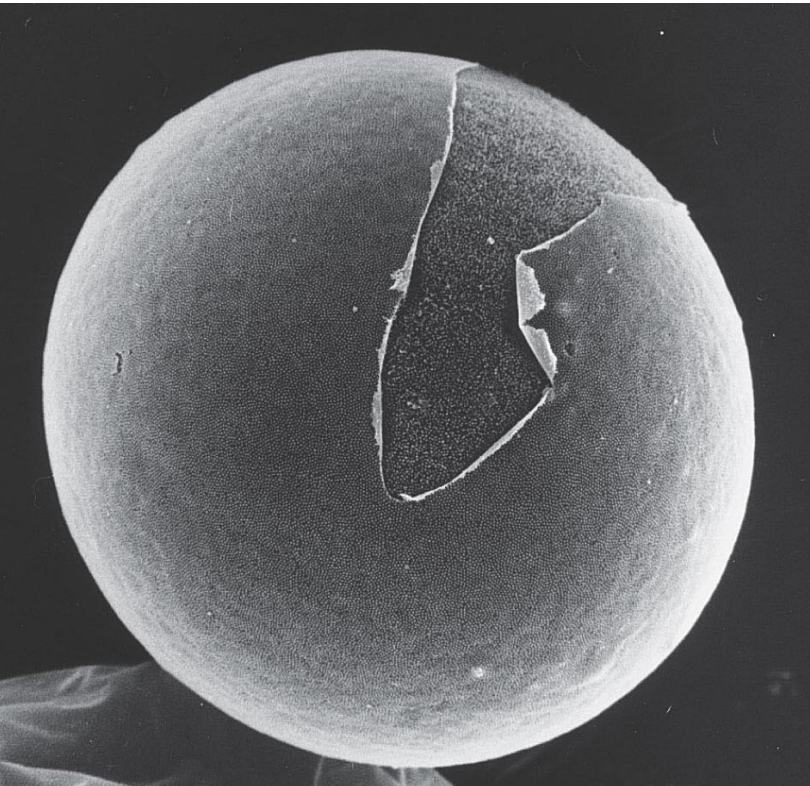


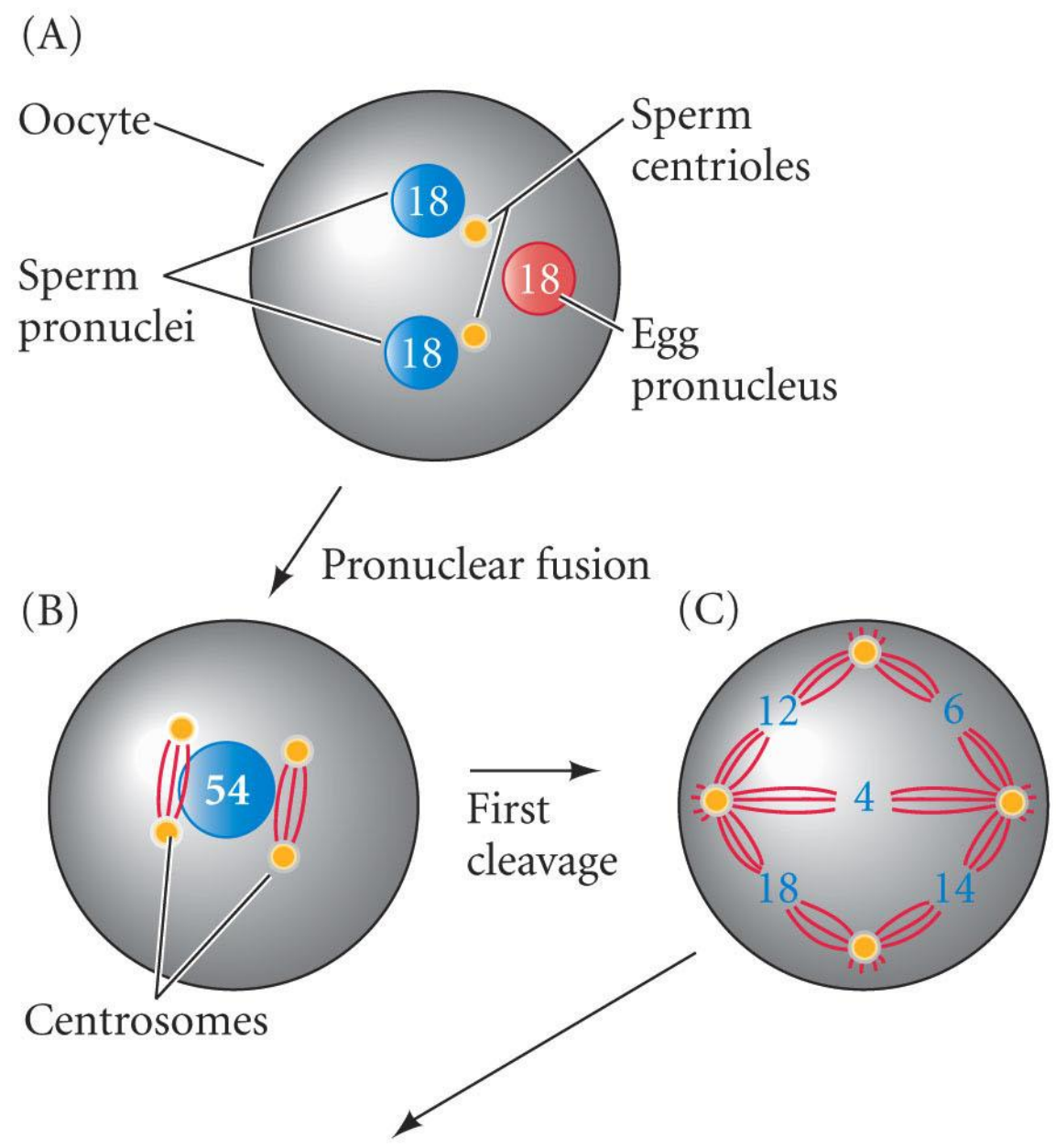
1. Aula teórica de Fertilização e clivagem (1h)
2. Atividade prática de clivagem (30 min)
3. Mini-simpósio de regeneração de planárias (1h30)

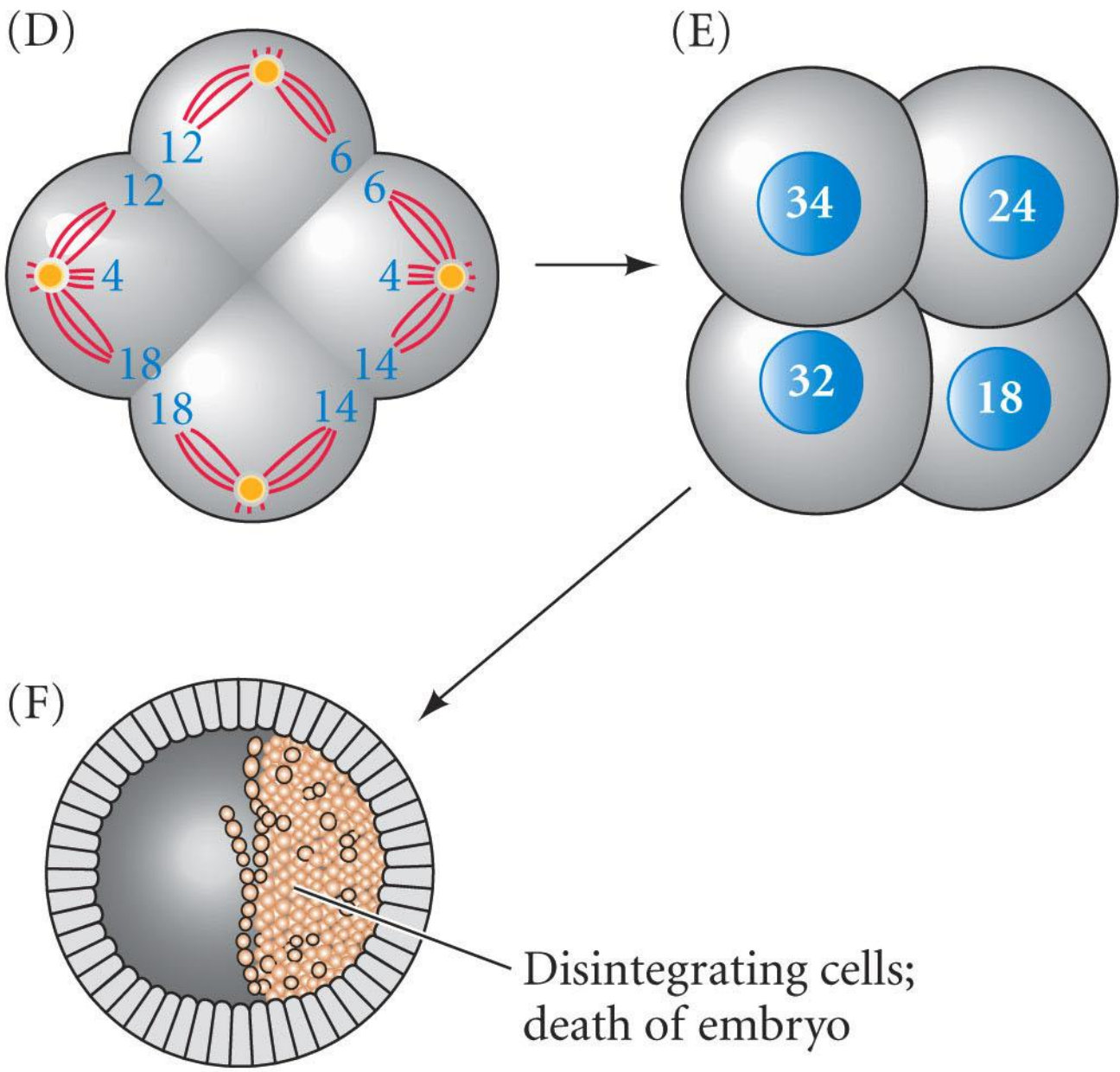




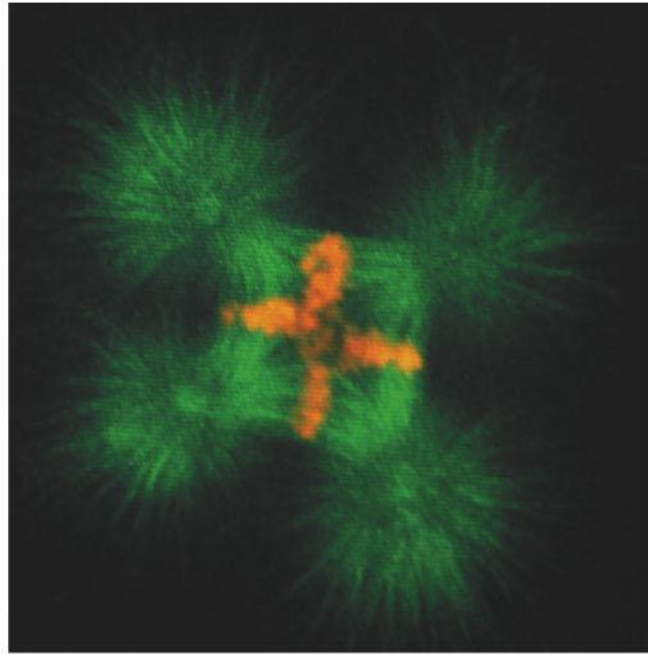
O que ocorre quando vários espermatozóides entram no ovo?

Desenvolvimento anormal no ovo dispermico de ouriço (Parte 1) - POLISPERMIA





(G)



(H)

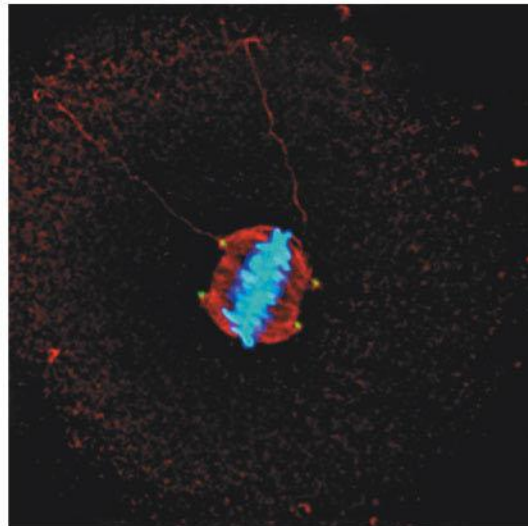


TABLE 7.1 Events of sea urchin fertilization

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Mitosis	60–80 min
First cleavage	85–95 min

Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

TABLE 7.1 Events of sea urchin fertilization

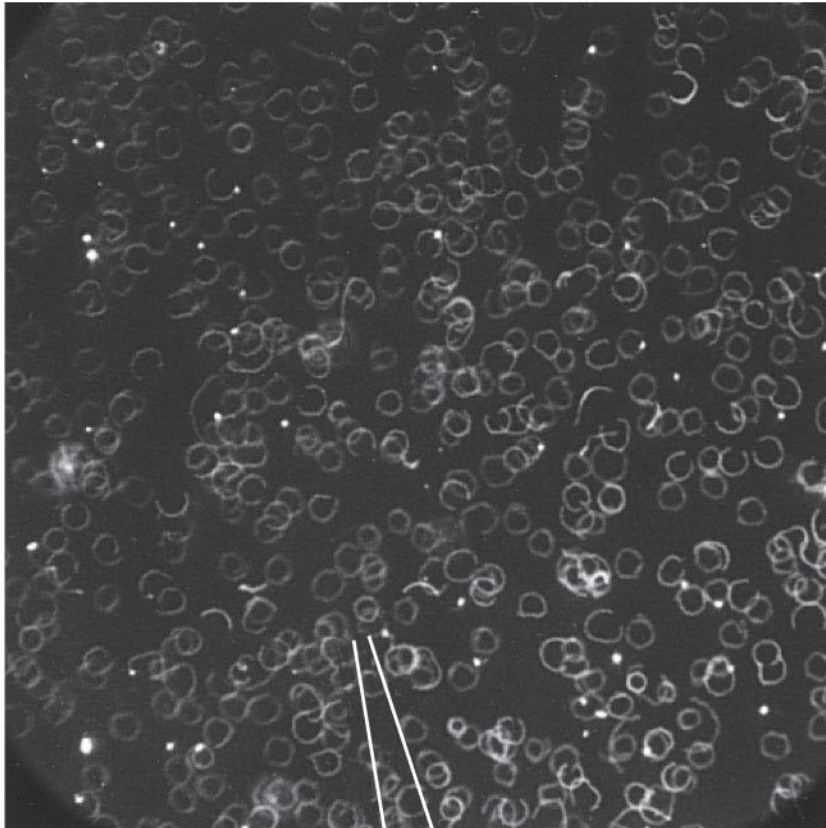
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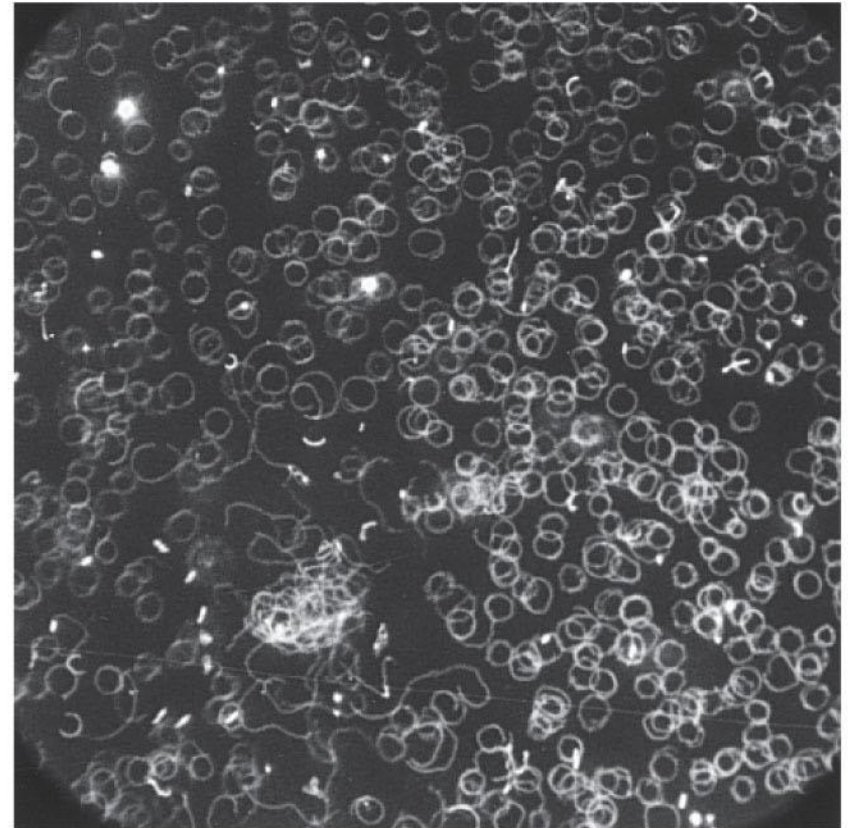
^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.



(A)

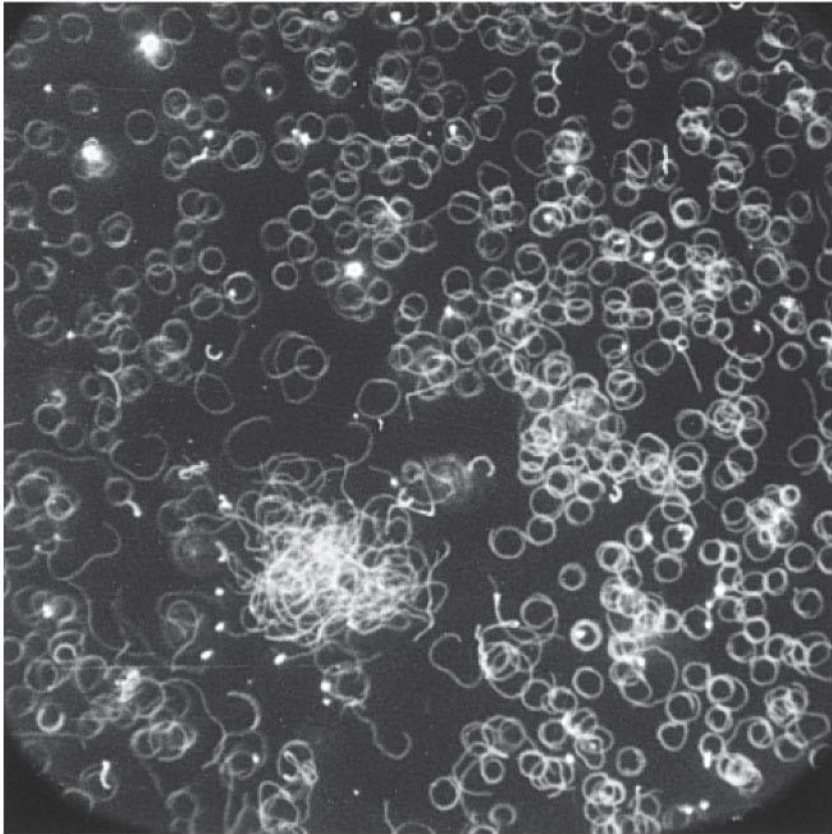


(B)

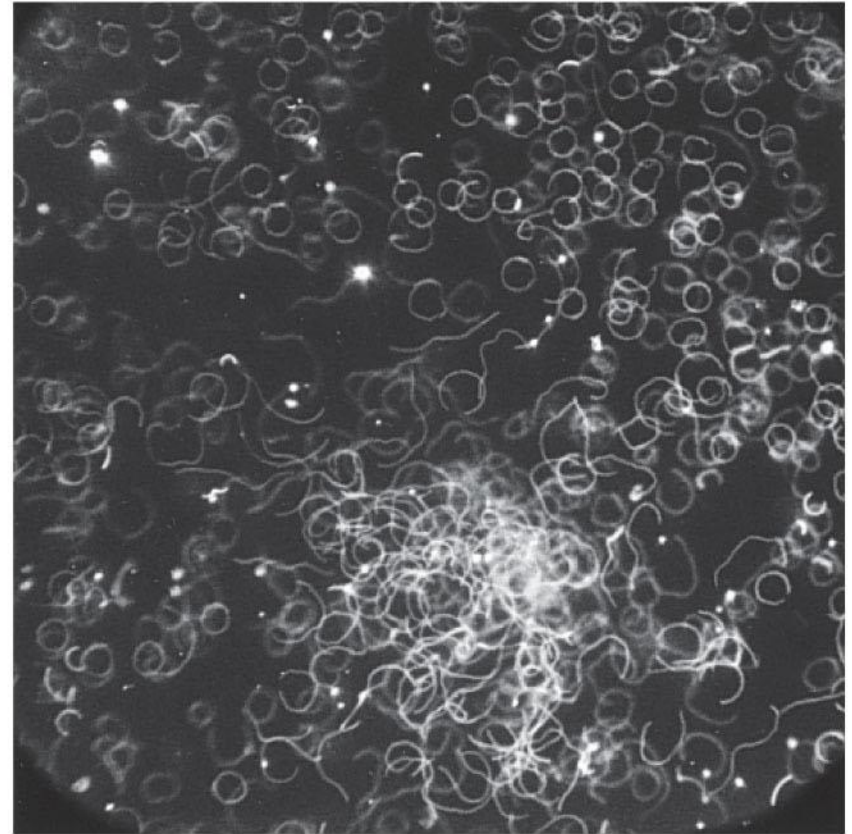


Molécula de quimioatração: resact

(C)



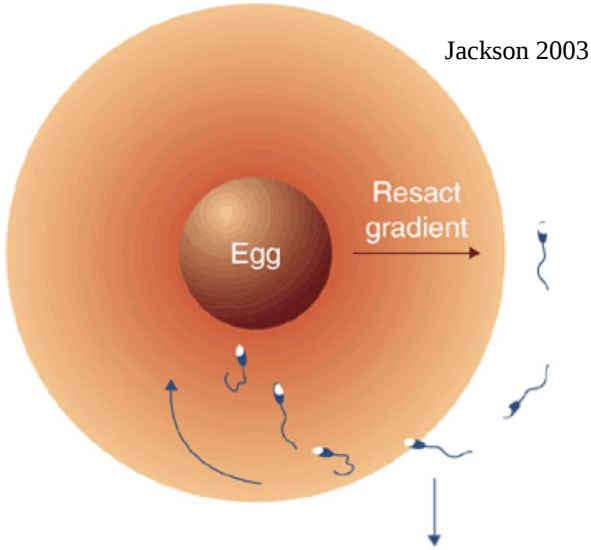
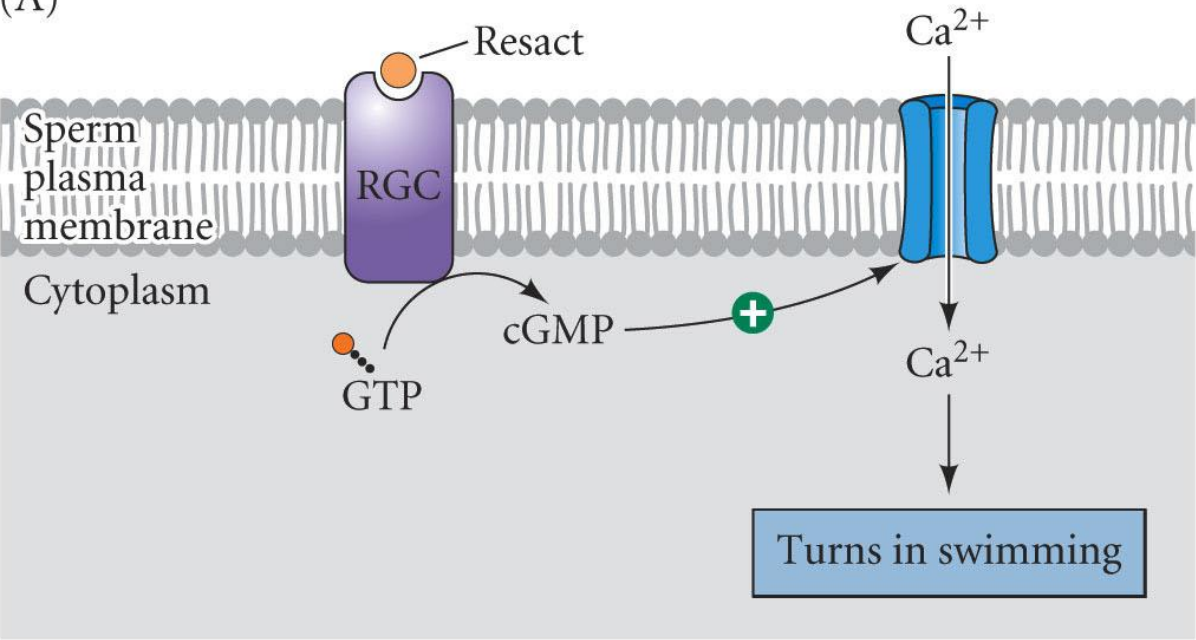
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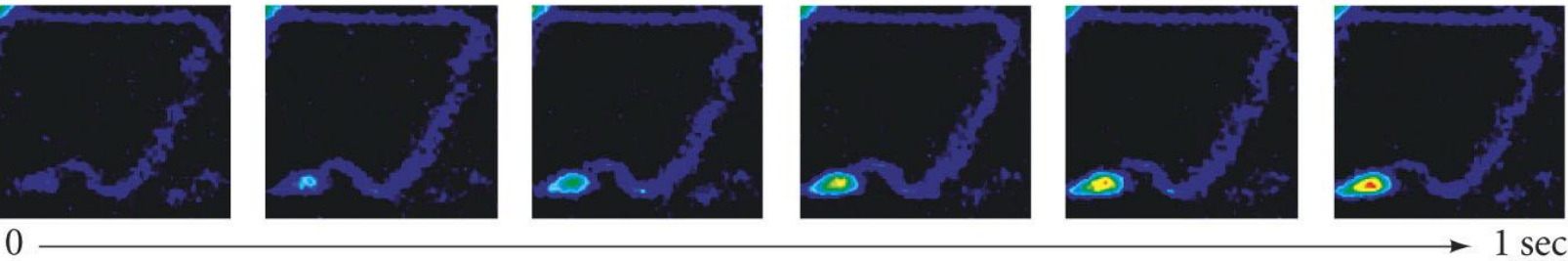
Molécula de quimioatração: resact

Modelo de peptídeos de quimiotaxis no esperma de ouriço

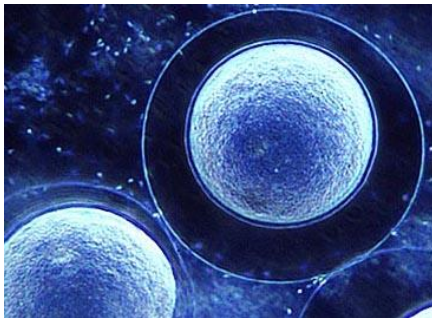
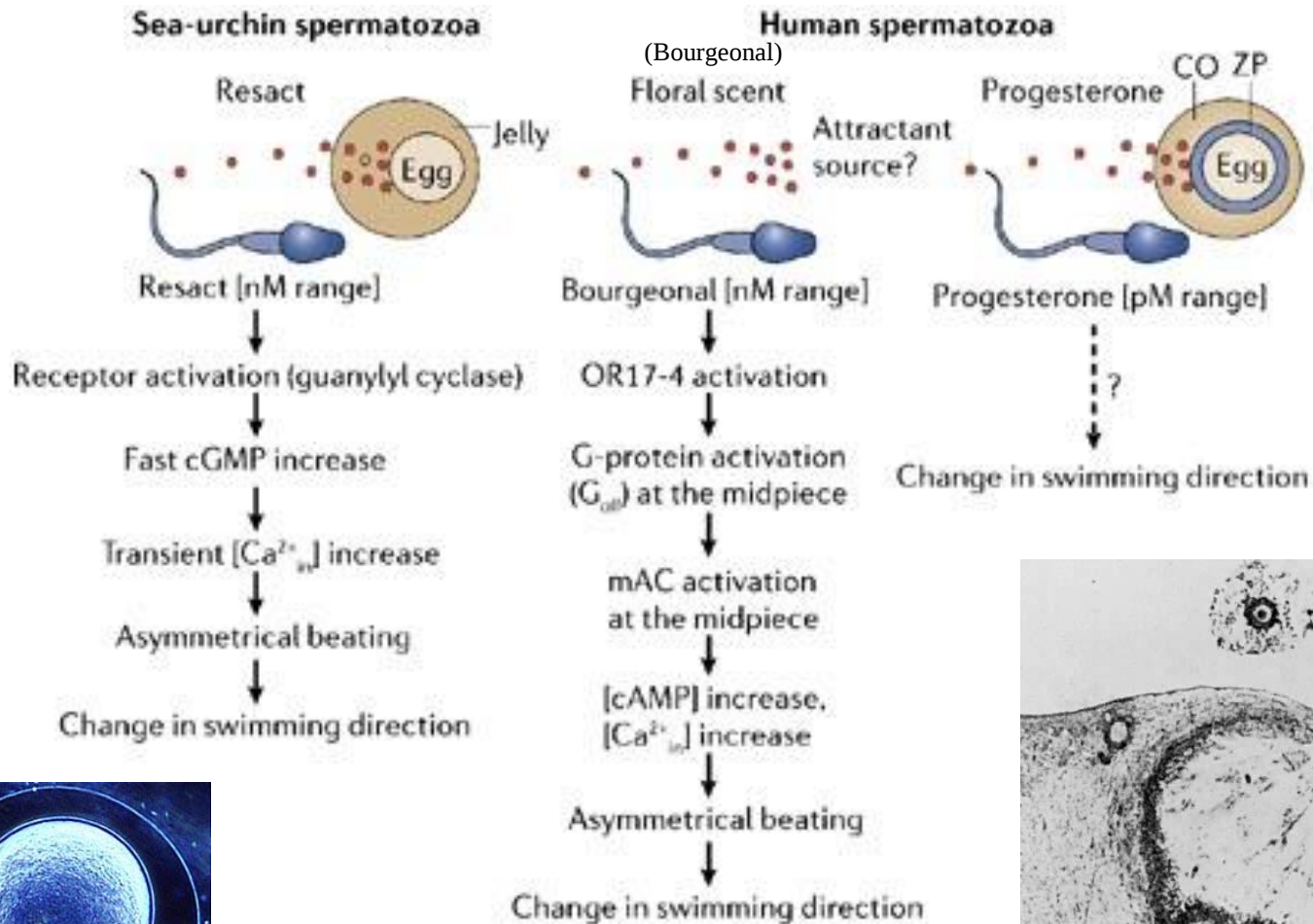
(A)



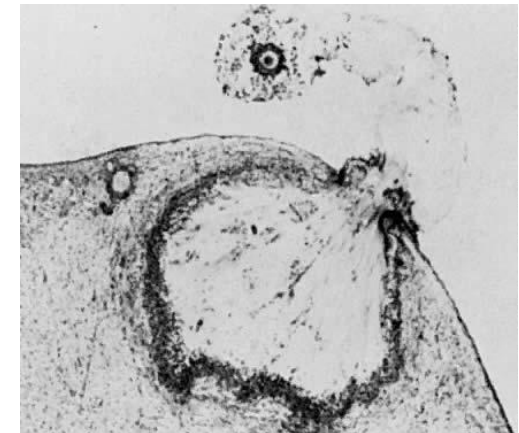
(B)



Chemoattractants



Courtesy Doug Chandler



Blandau, 1970

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Nature Reviews | Molecular Cell Biology

Eisenbach *et al.* *Nature Reviews Molecular Cell Biology* 7, 276–285 (April 2006) | doi:10.1038/nrm1893

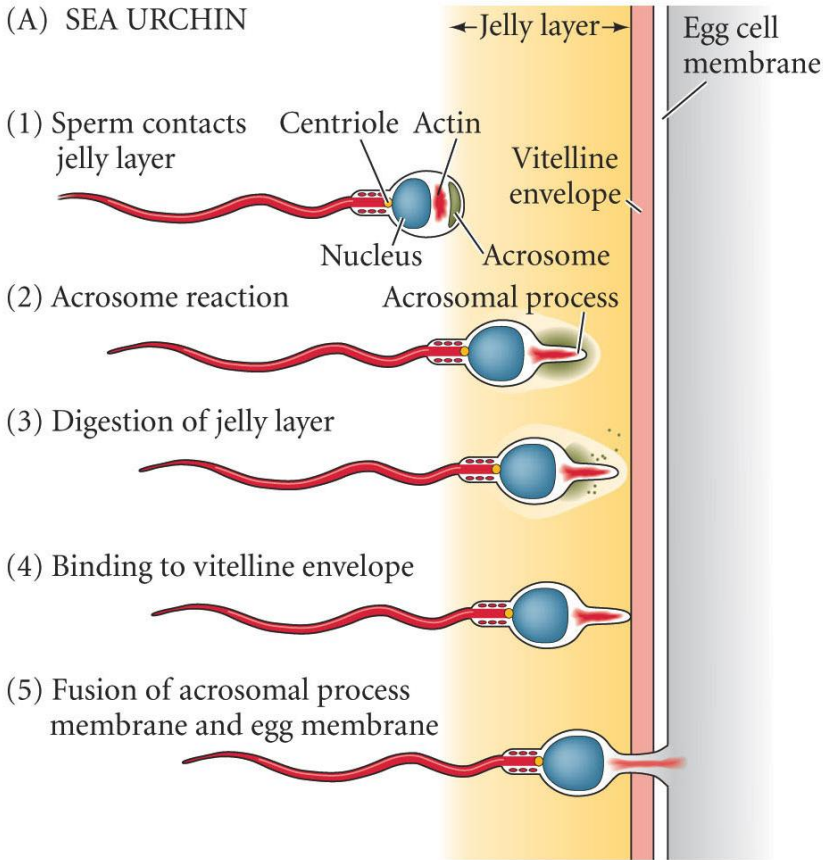
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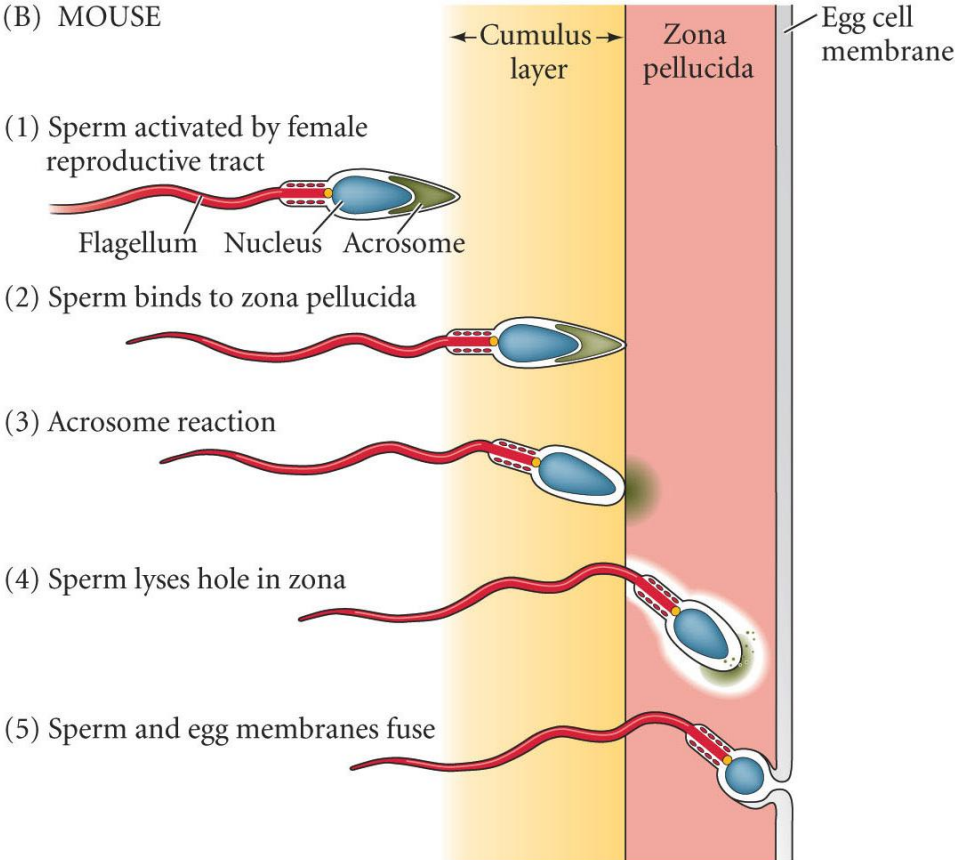
Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

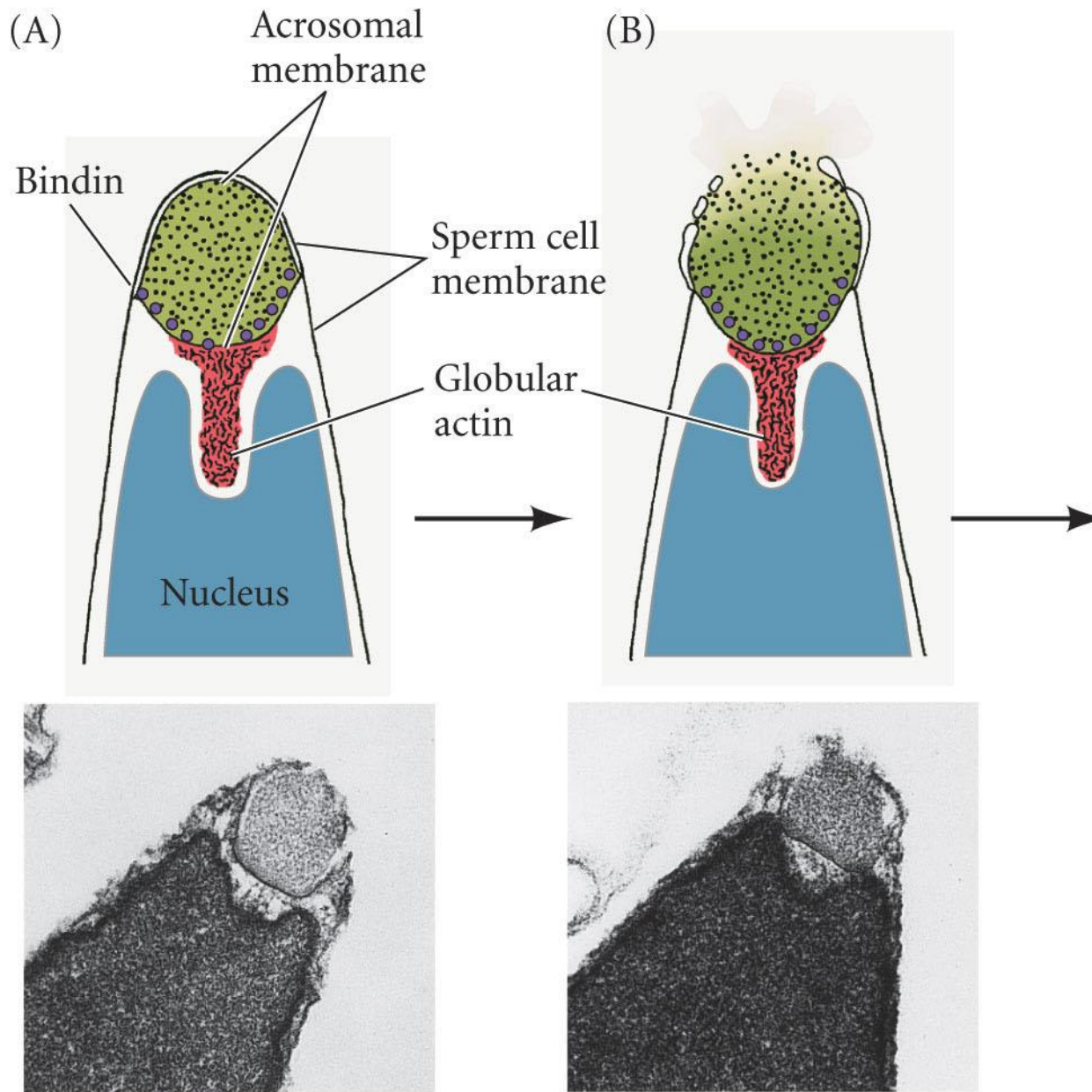
(A) SEA URCHIN



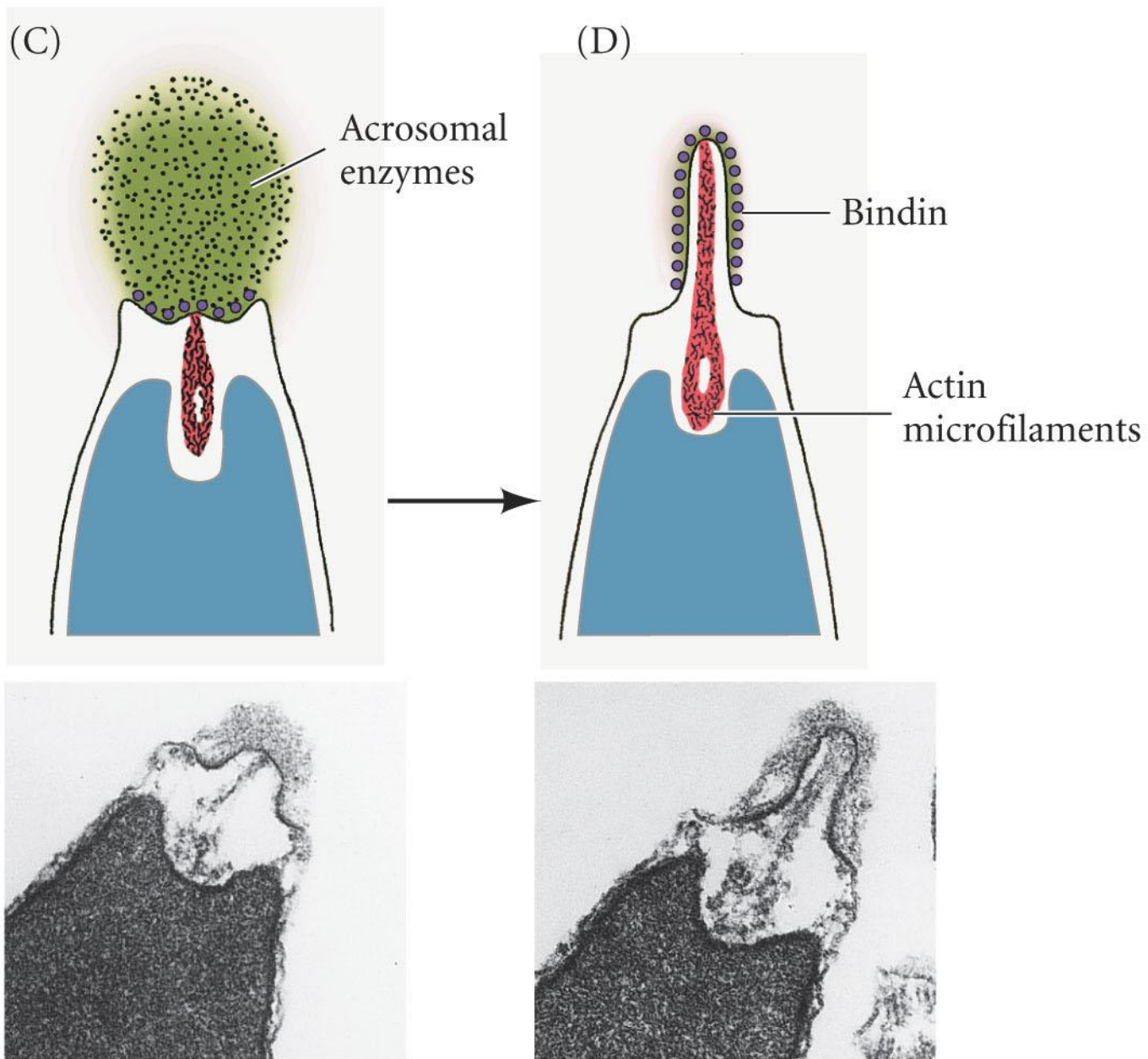
(B) MOUSE



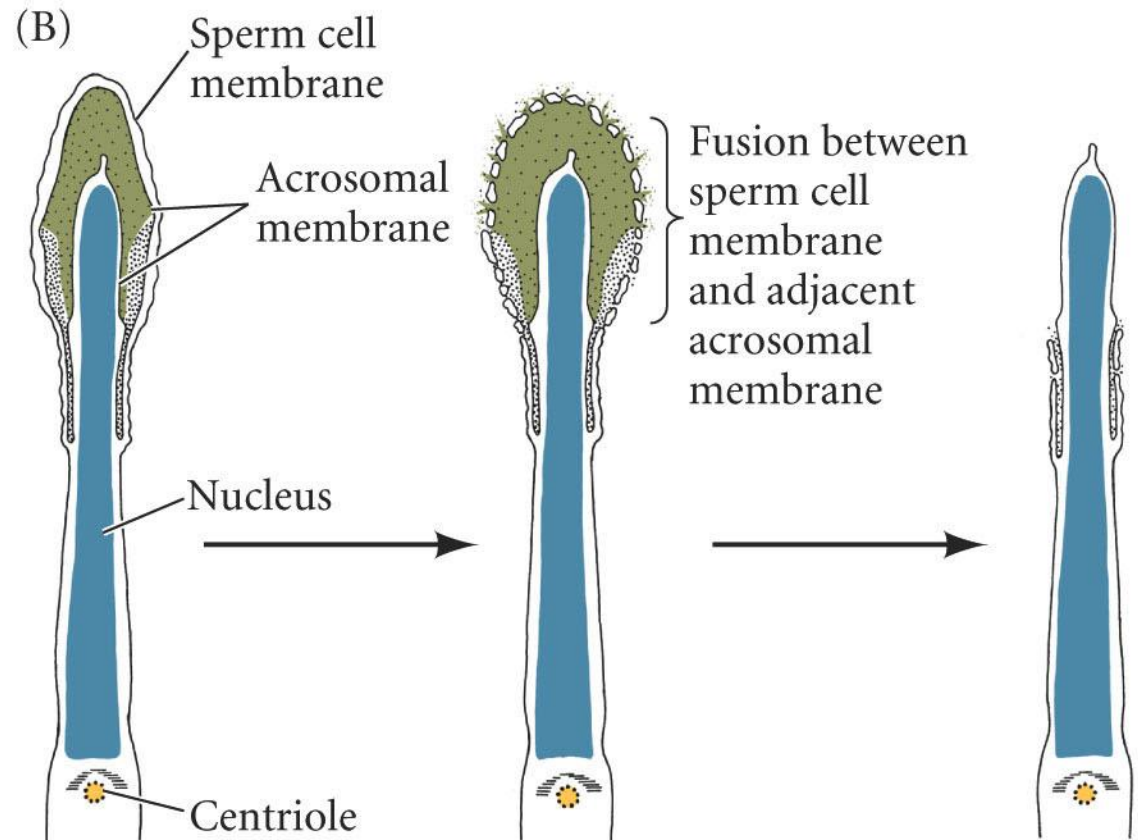
A reação do acrossoma no espermatozoado de ouriço do mar (Parte 1)

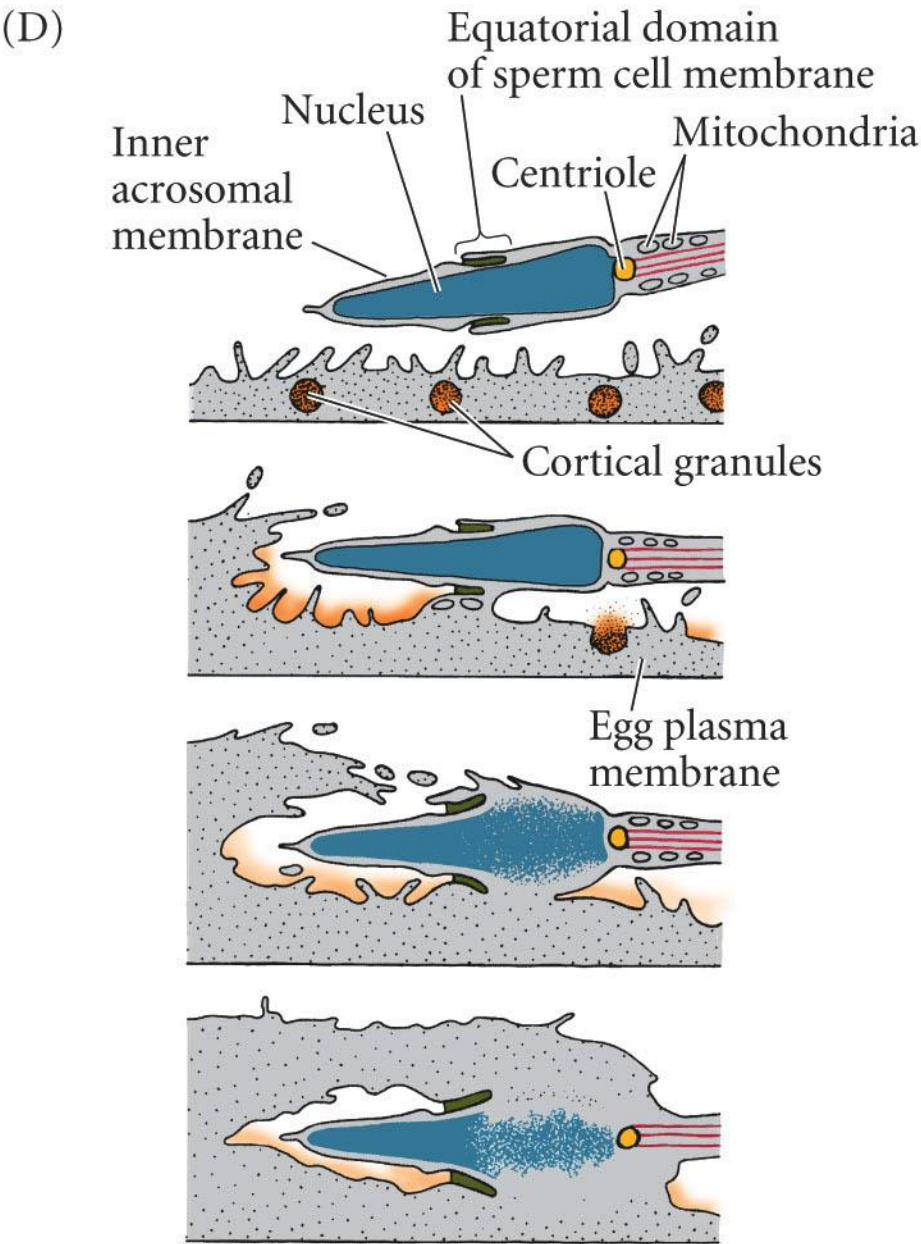


A reação do acrossoma no espermatozoário de ouriço do mar (Parte 2)

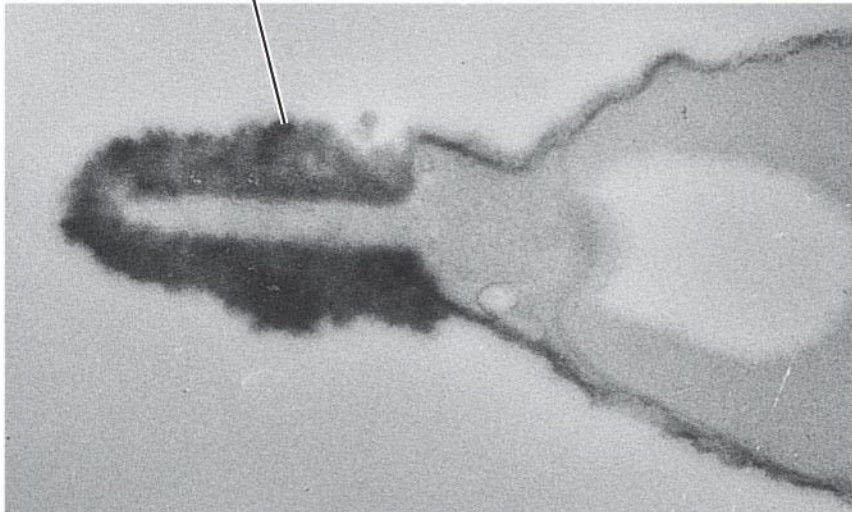


A reação do acrossoma no espermatozoides de hamster

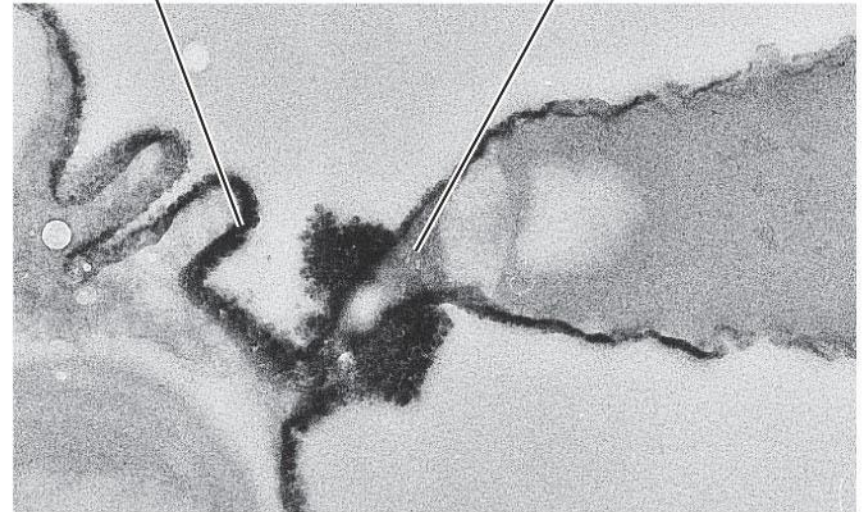


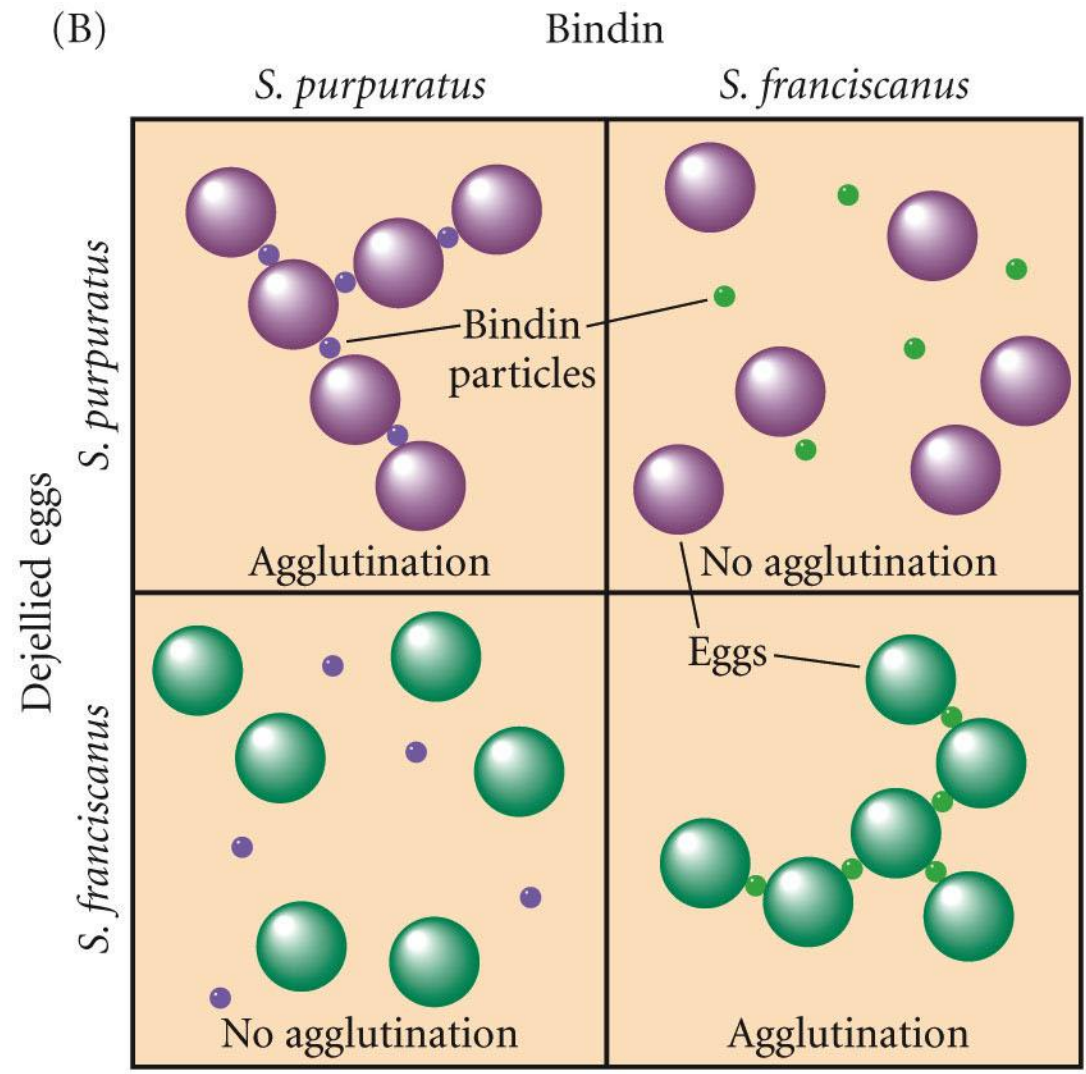


(B) Bindin

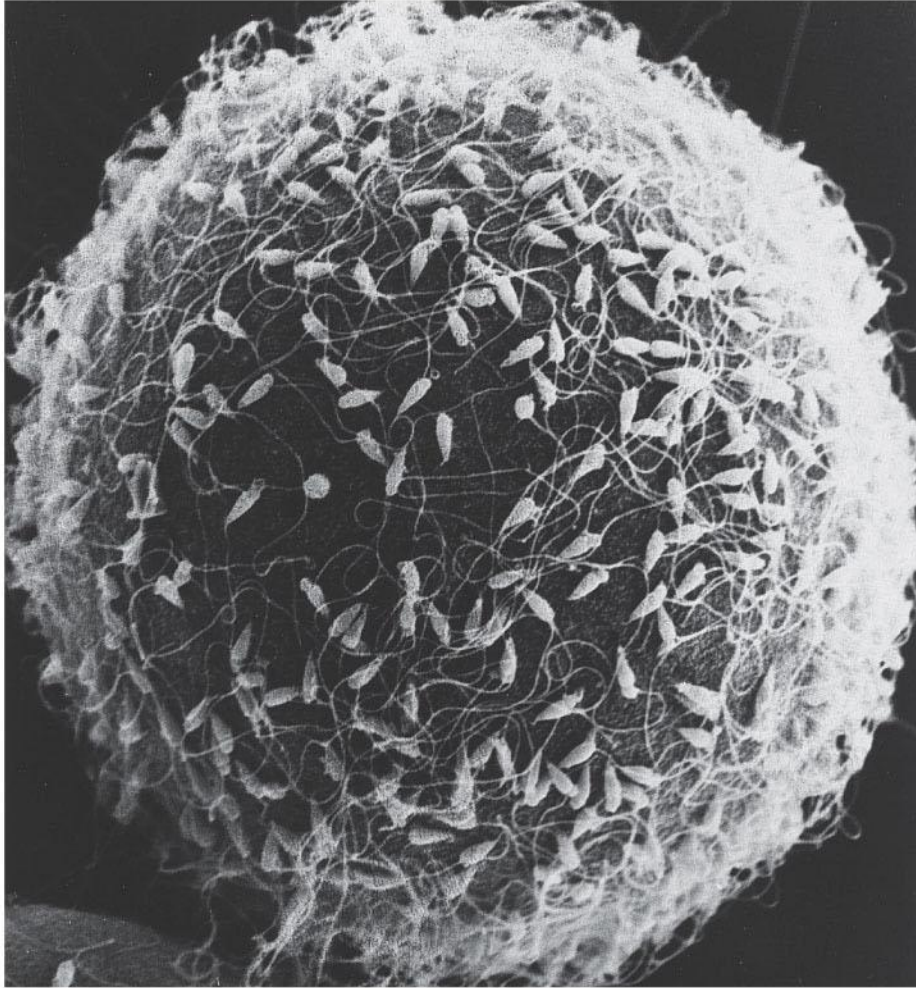


(C) Vitelline envelope of egg Acrosomal process

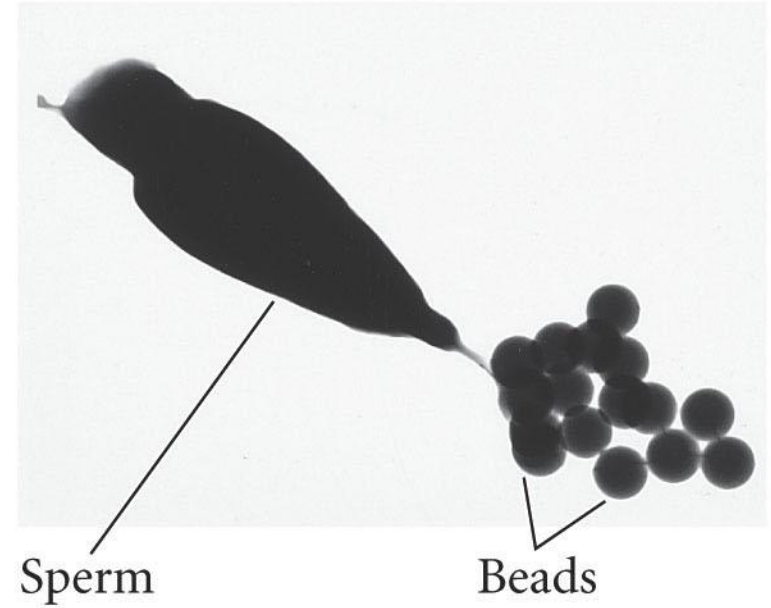


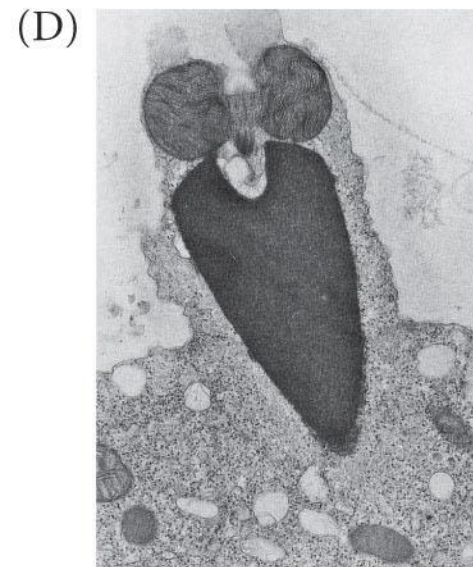
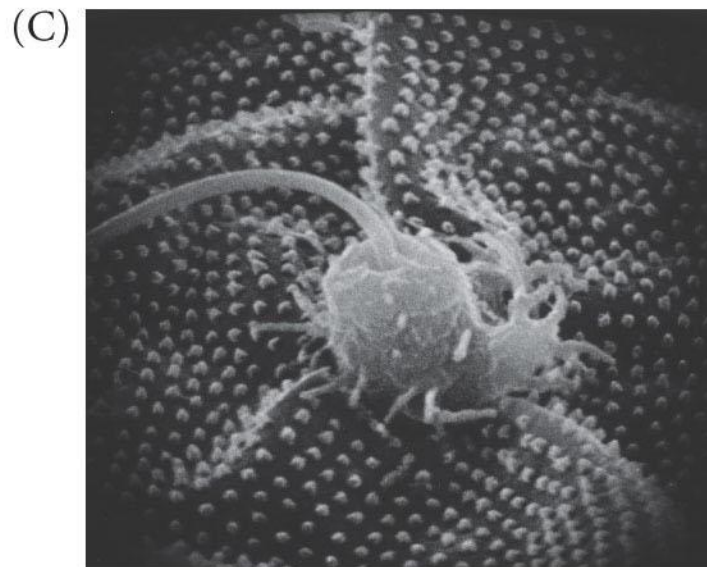
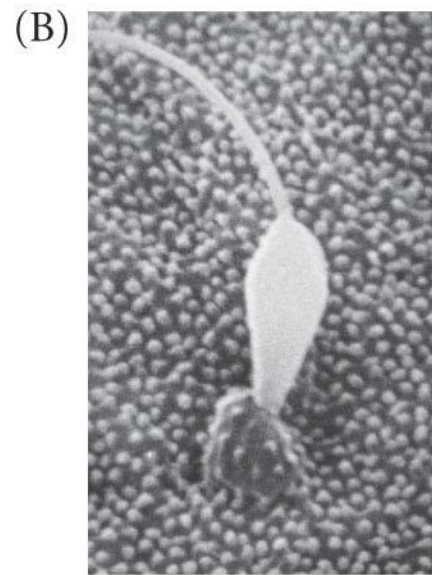
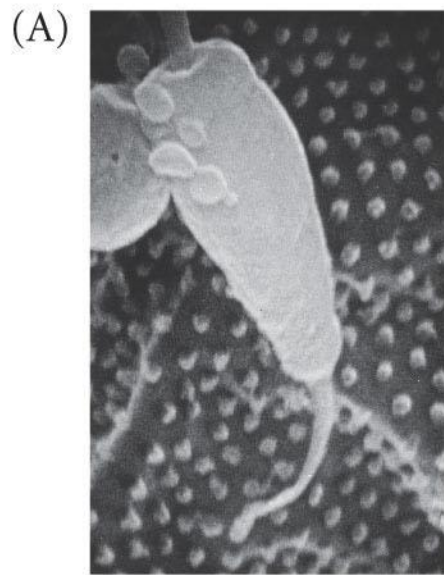


(A)

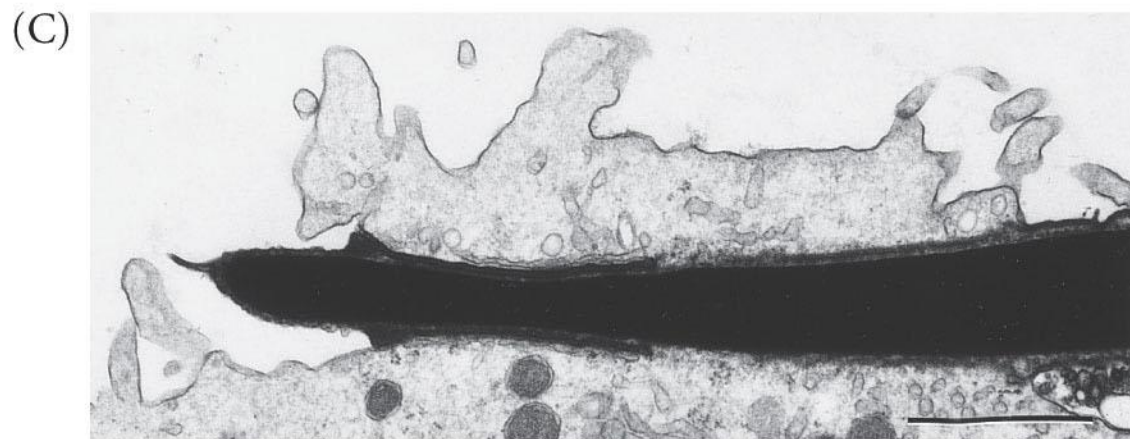
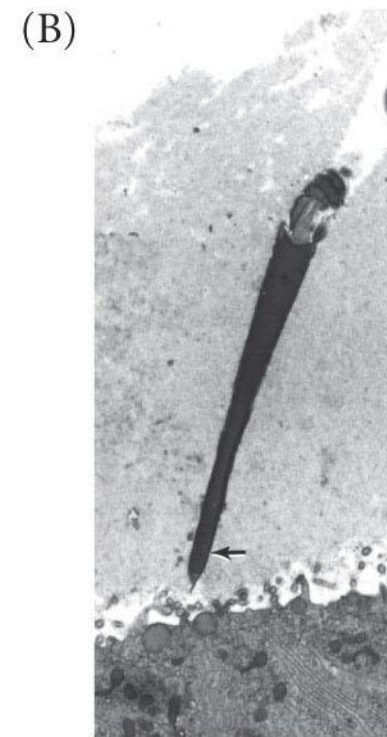
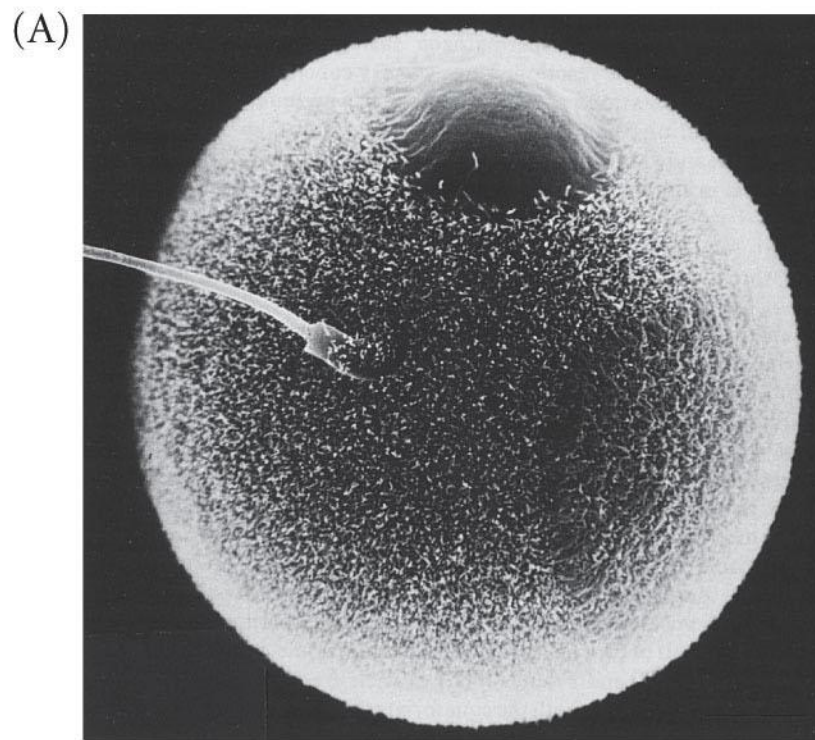


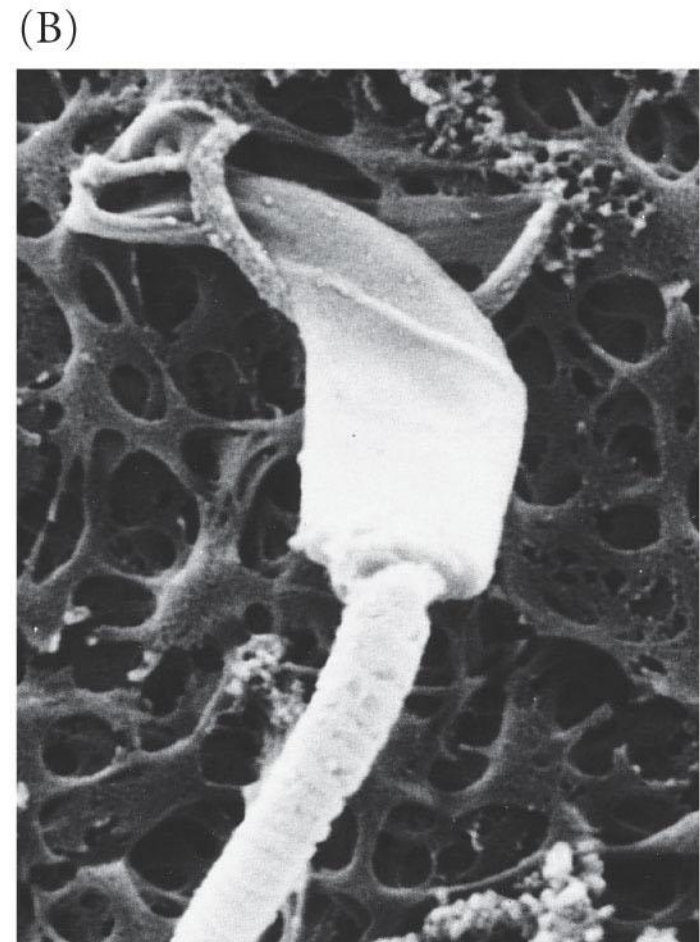
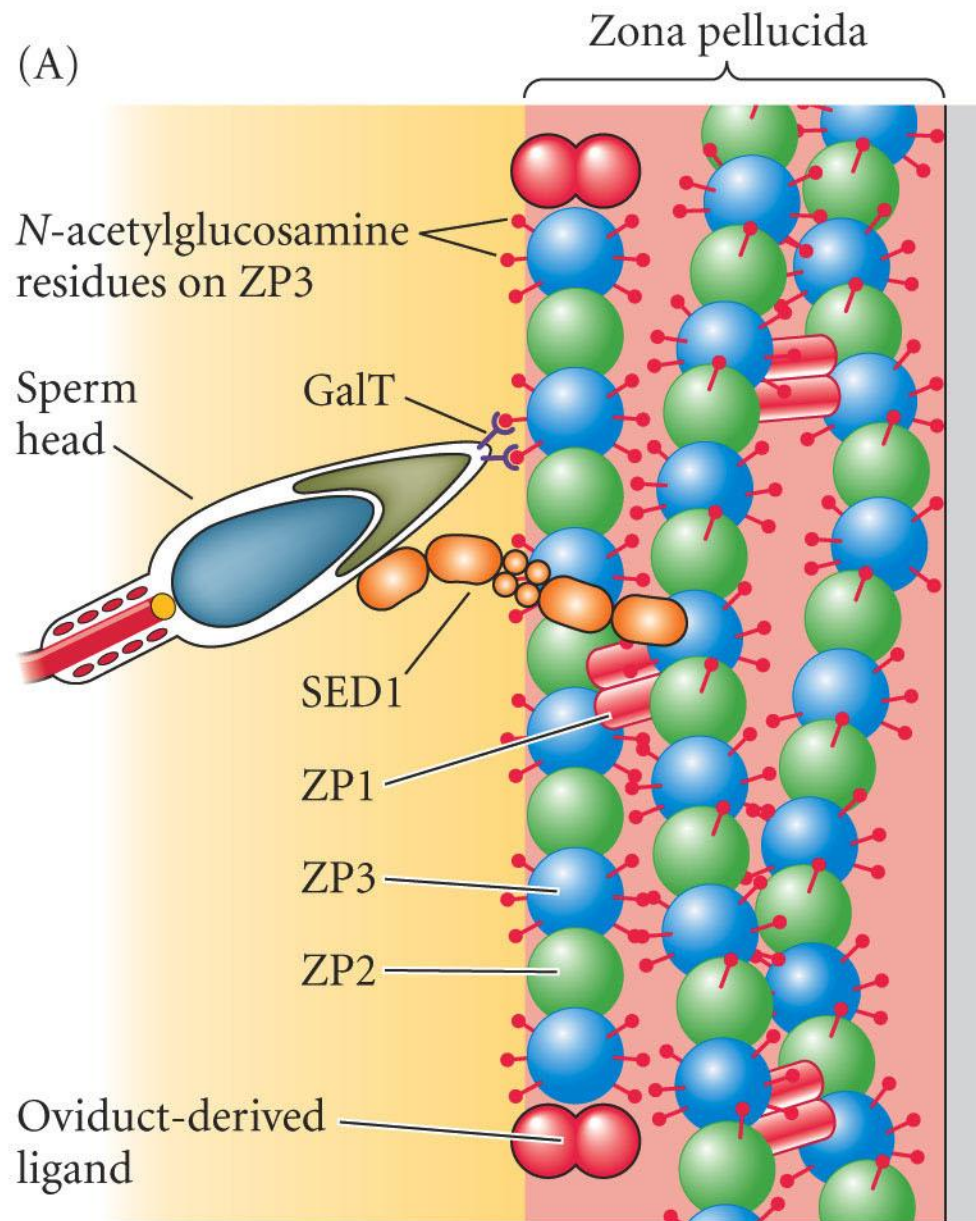
(B)





Entrada do espermatozoado no ovo de um hamster





Pense em um experimento para comprovar a função dos resíduos de açúcar no reconhecimento.

Proteína 3 da zona pelúcida de camundongo se liga ao esperma

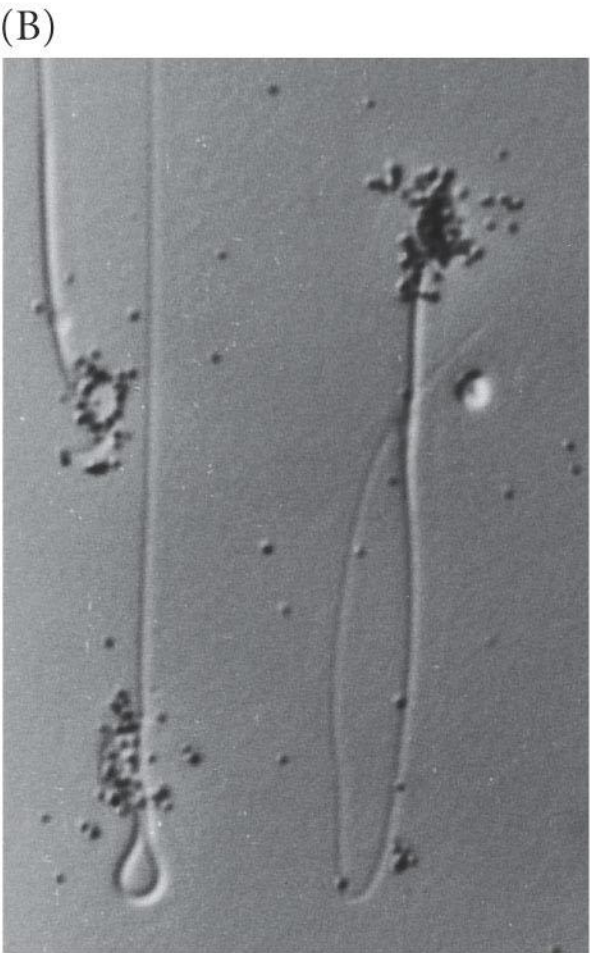
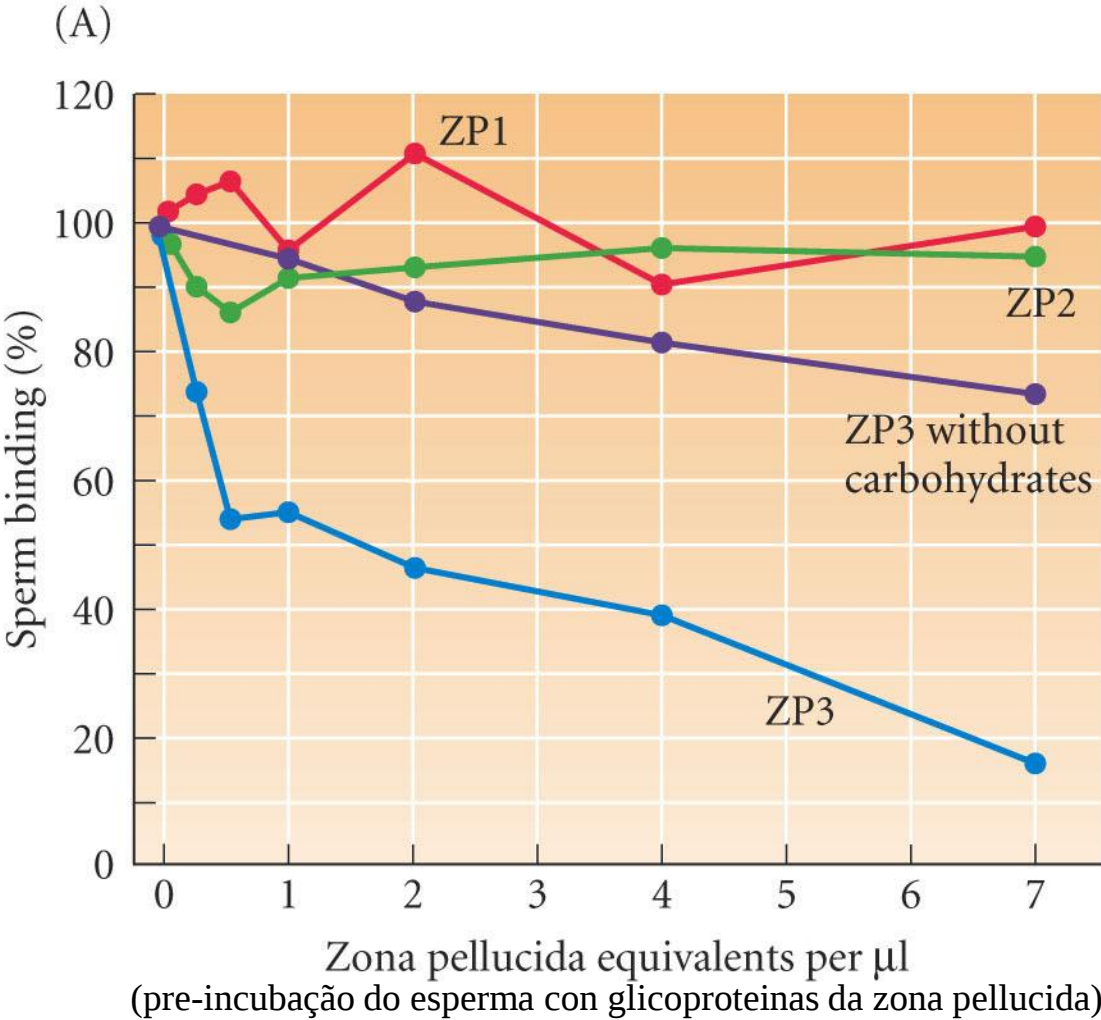


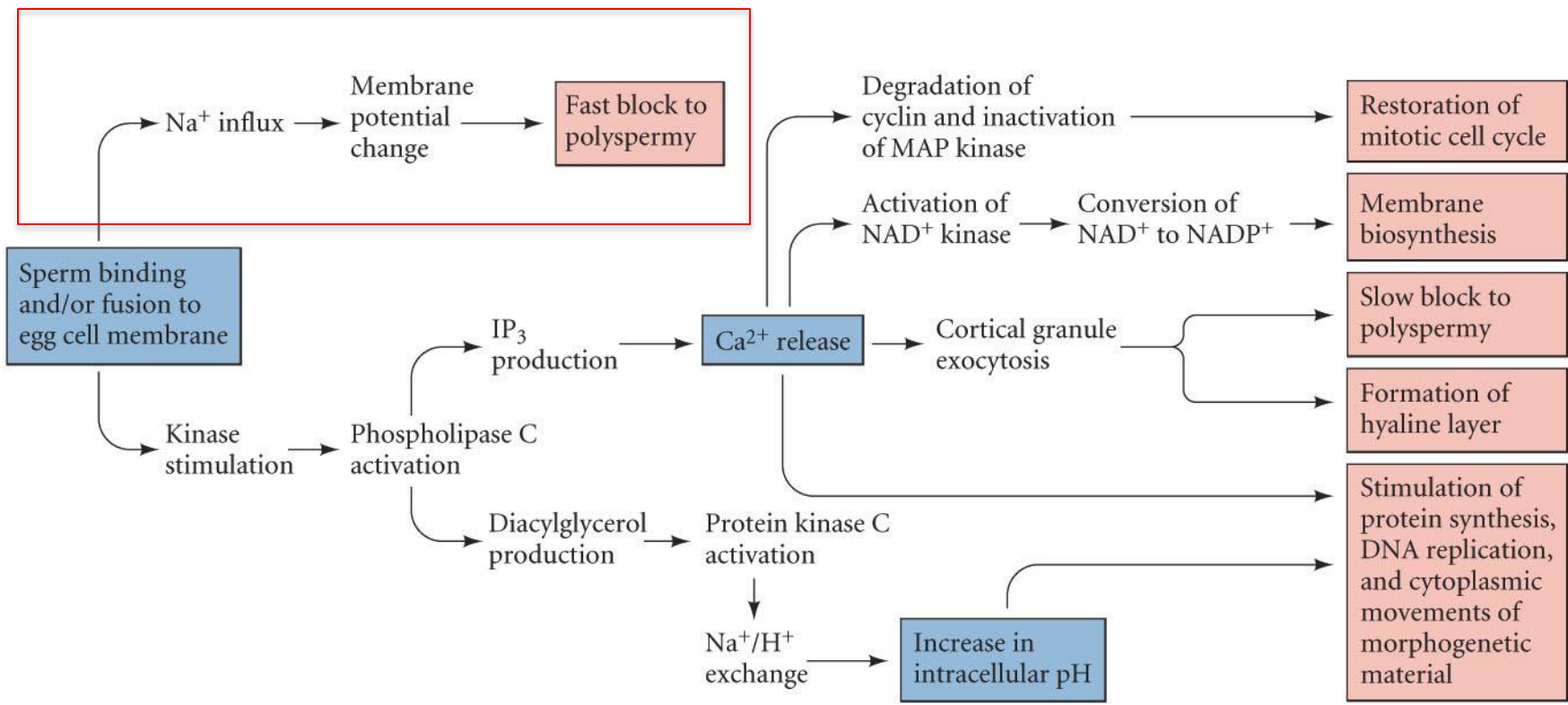
TABLE 7.1 Events of sea urchin fertilization

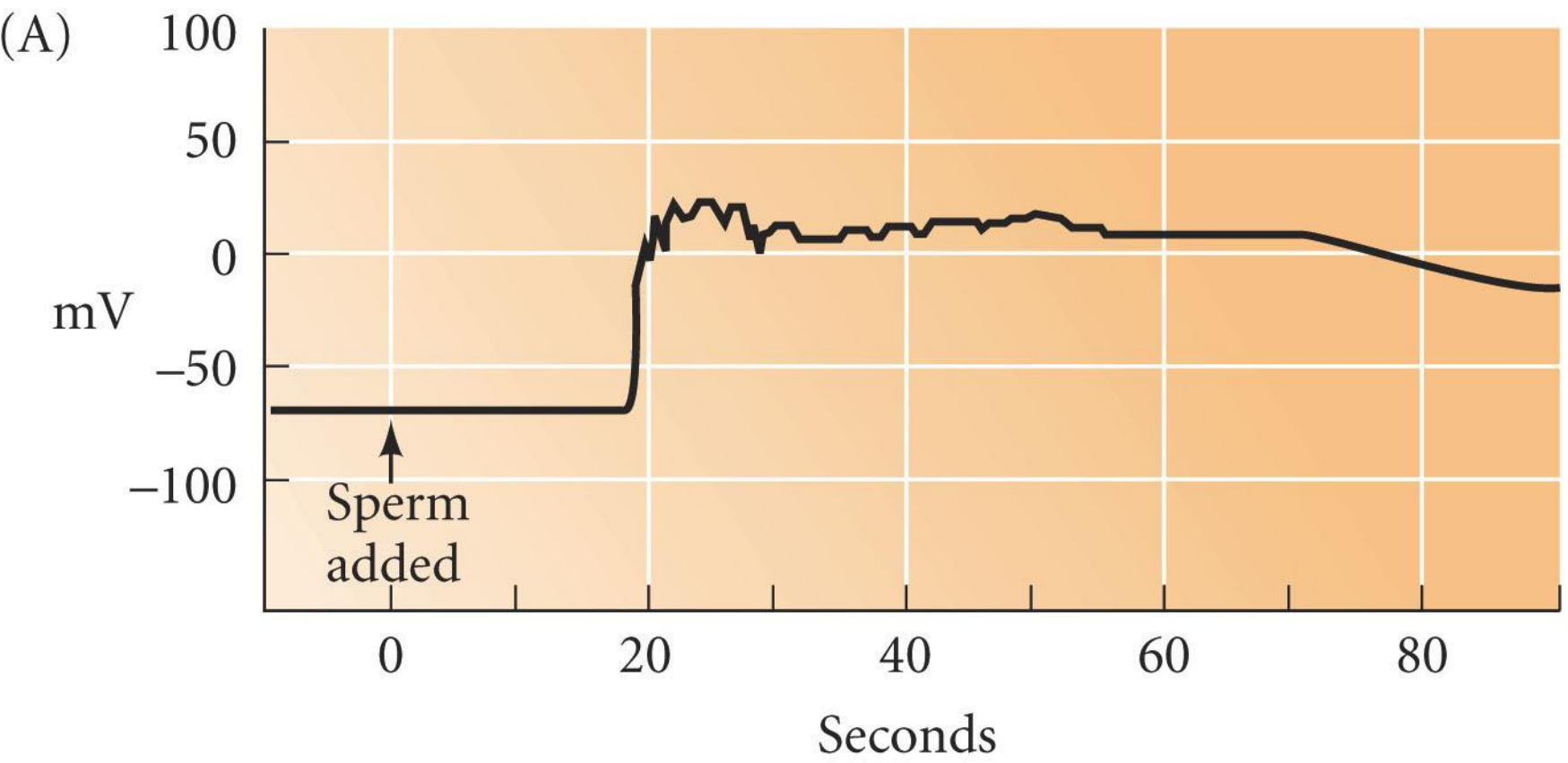
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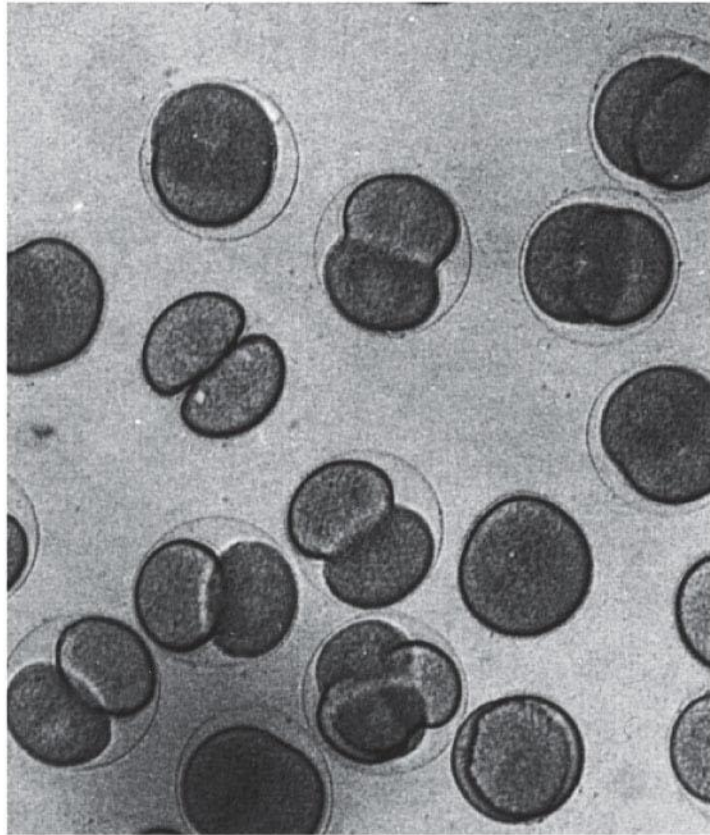
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Proposta via de ativação do ovo de ouriço



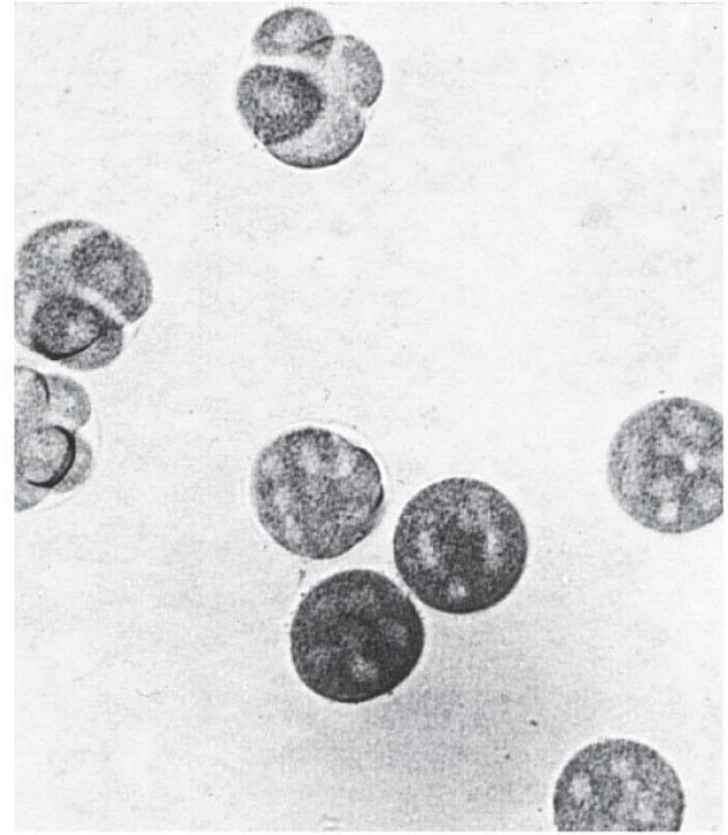


(B)



Controle (490 mM Na⁺)

(C)



Meio com pouco sódio (120 mM)

(D)

Na⁺ (mM)	Percentage of polyspermic eggs
490	22
360	26
120	97
50	100

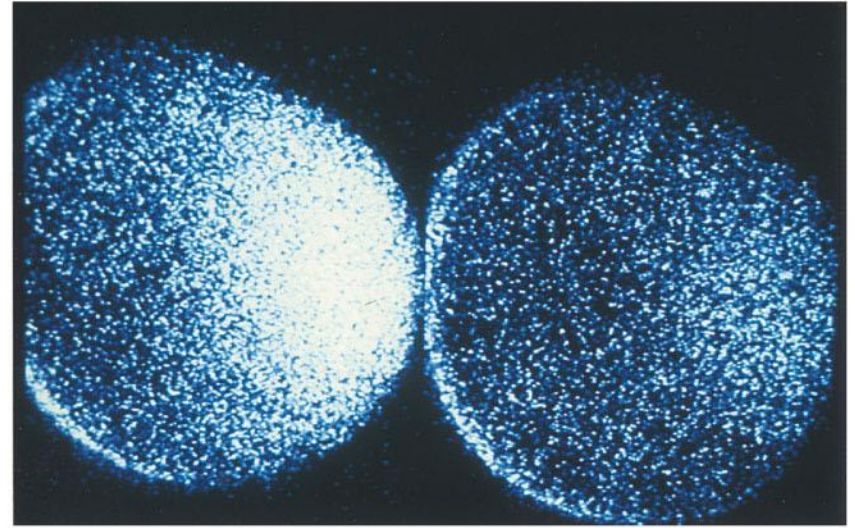
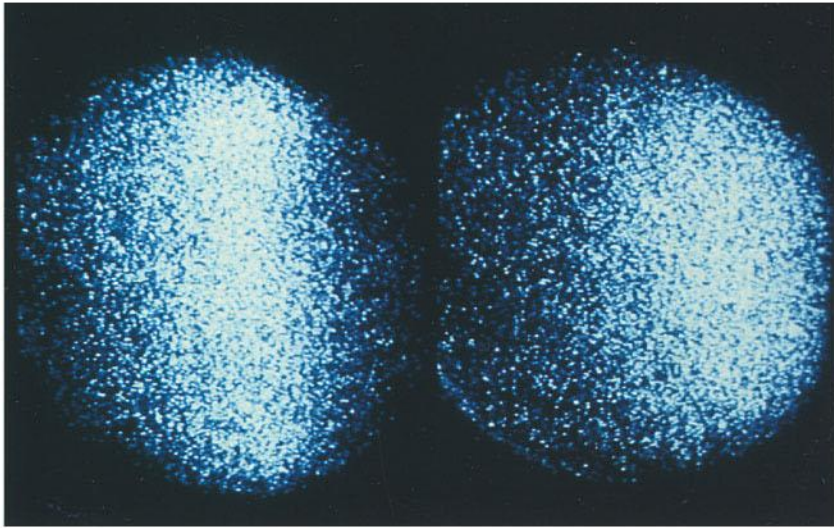
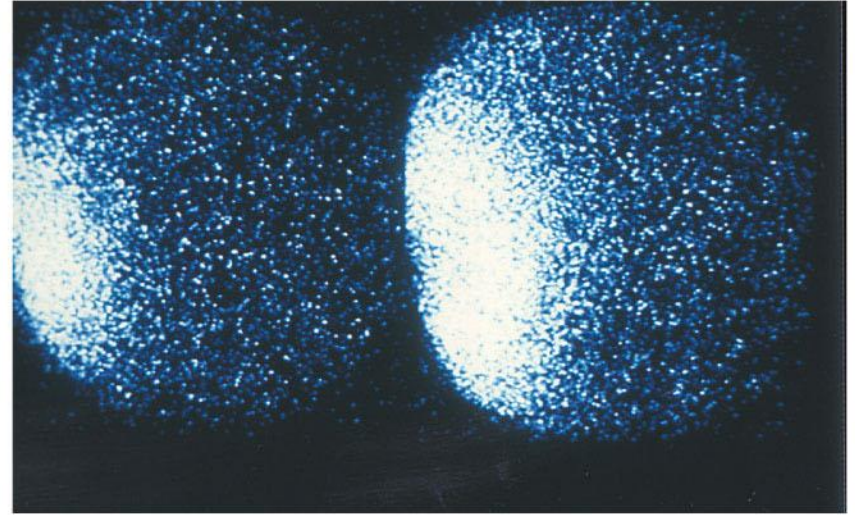
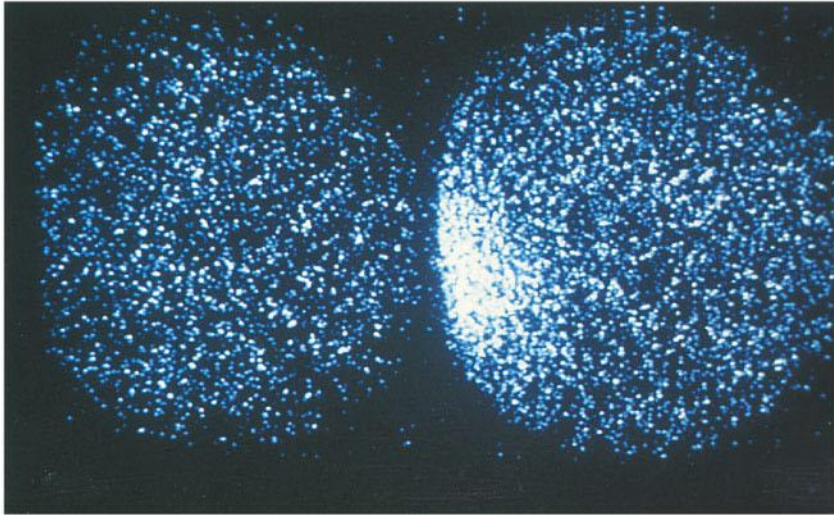
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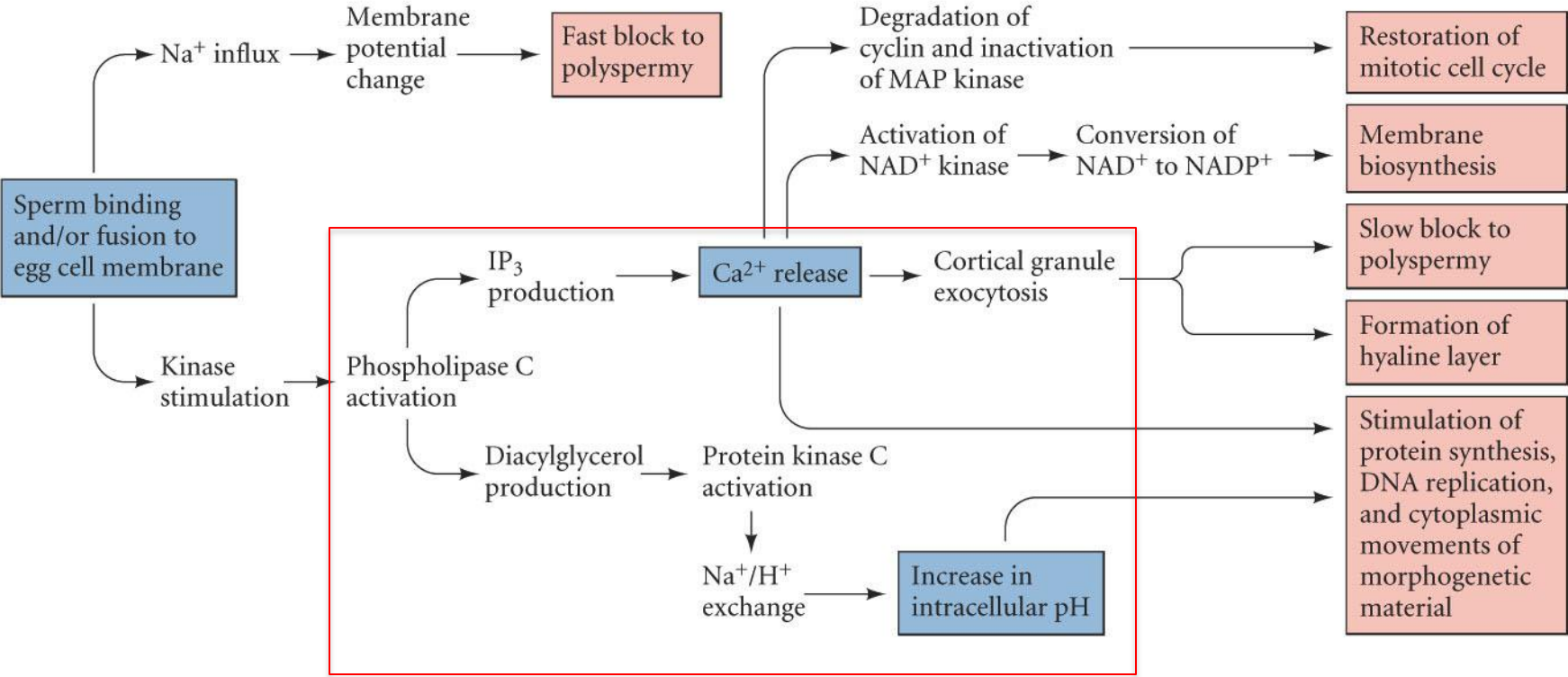
Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

Onda de liberação de Ca^{2+} em um ovo de ouriço durante a fertilização



Proposta via de ativação do ovo de ouriço



Os papéis dos fosfatos de inositol na liberação de cálcio do retículo endoplasmático e o início do desenvolvimento

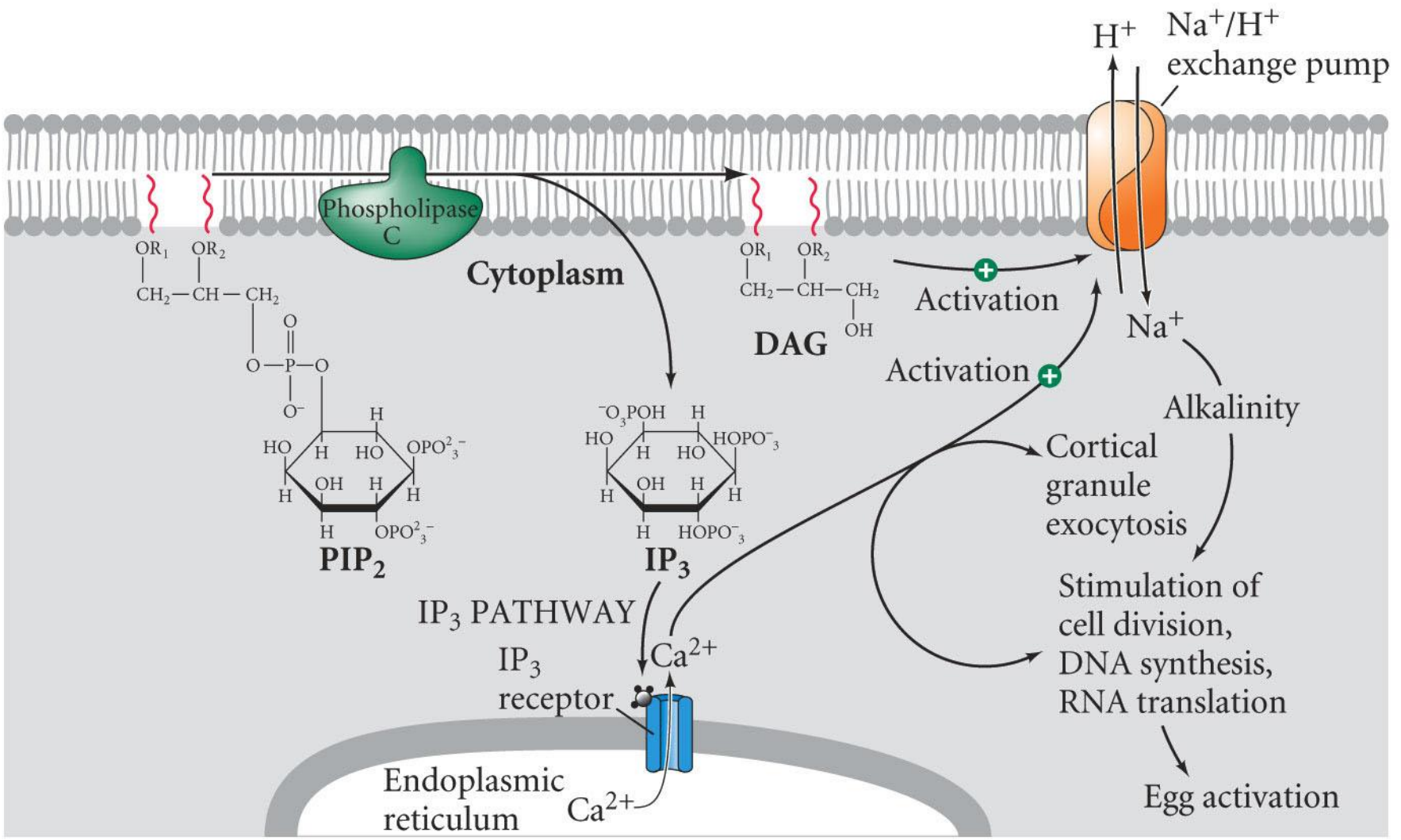


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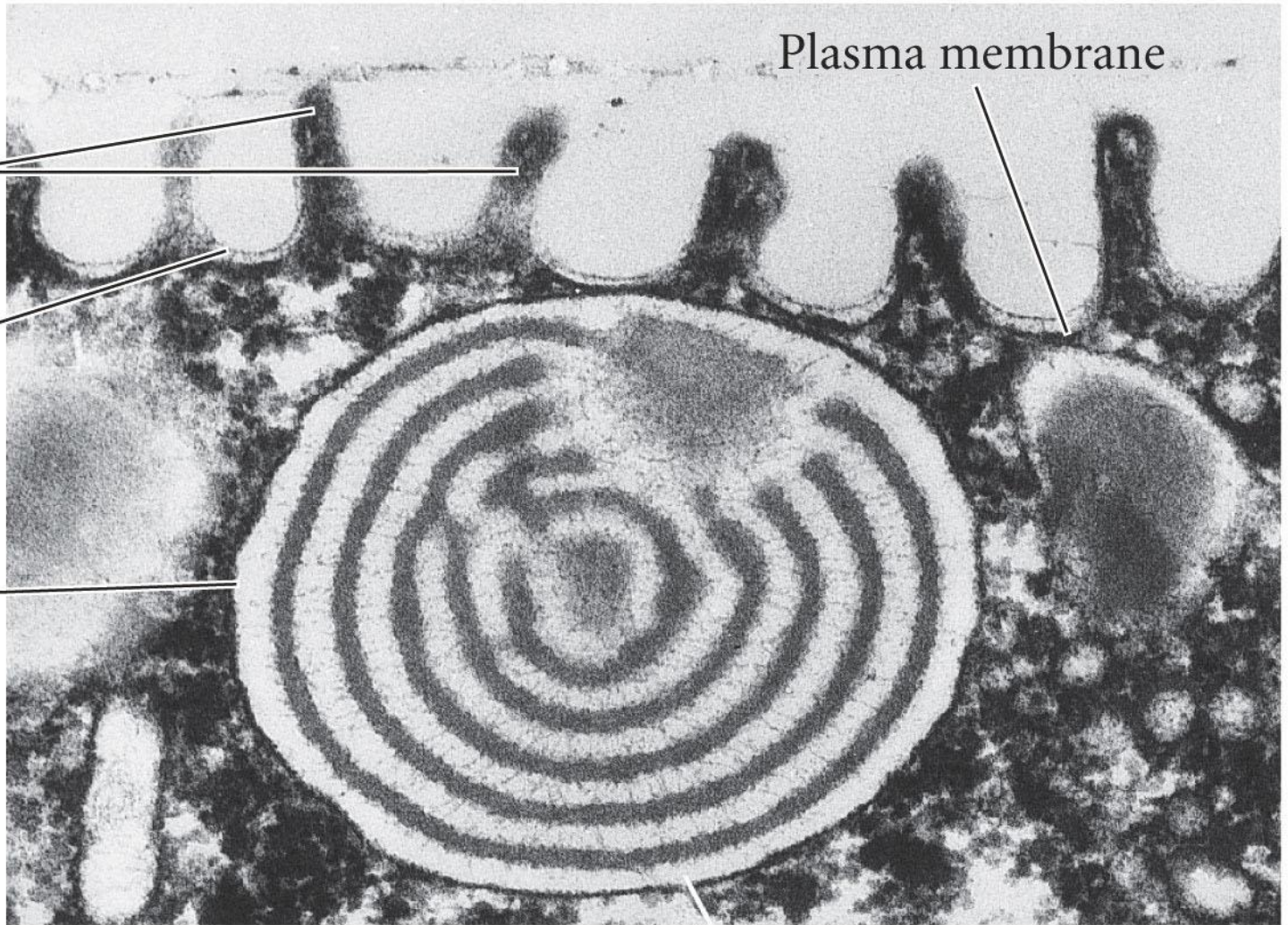
(B)

Microvilli

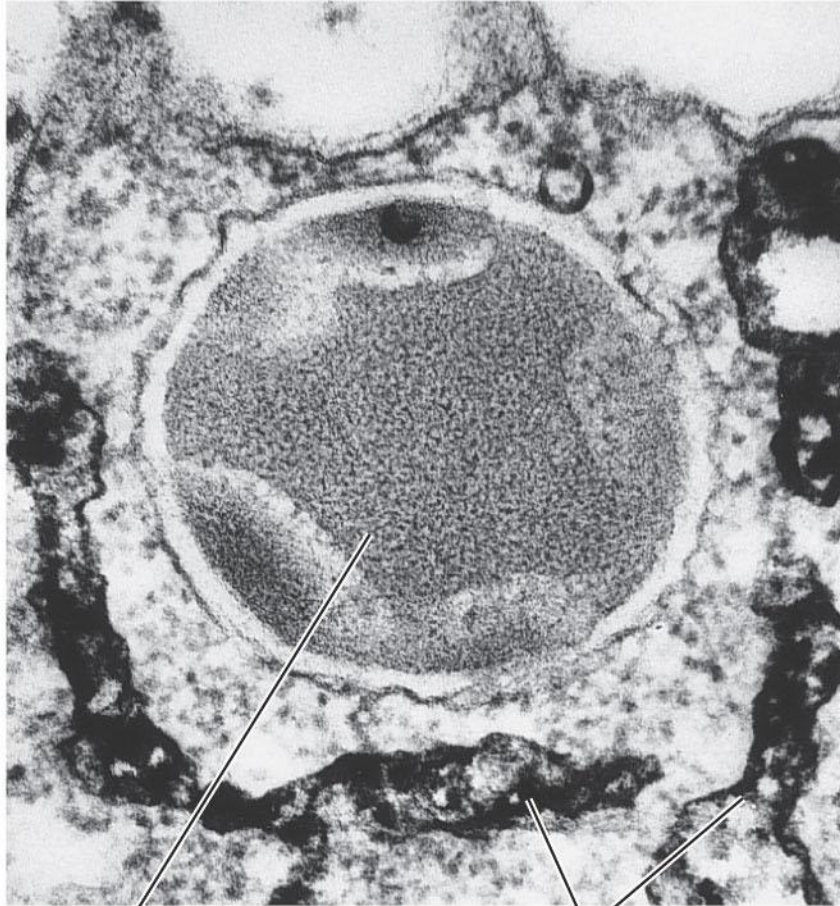
Vitelline
envelope

Cortical
granule

Plasma membrane



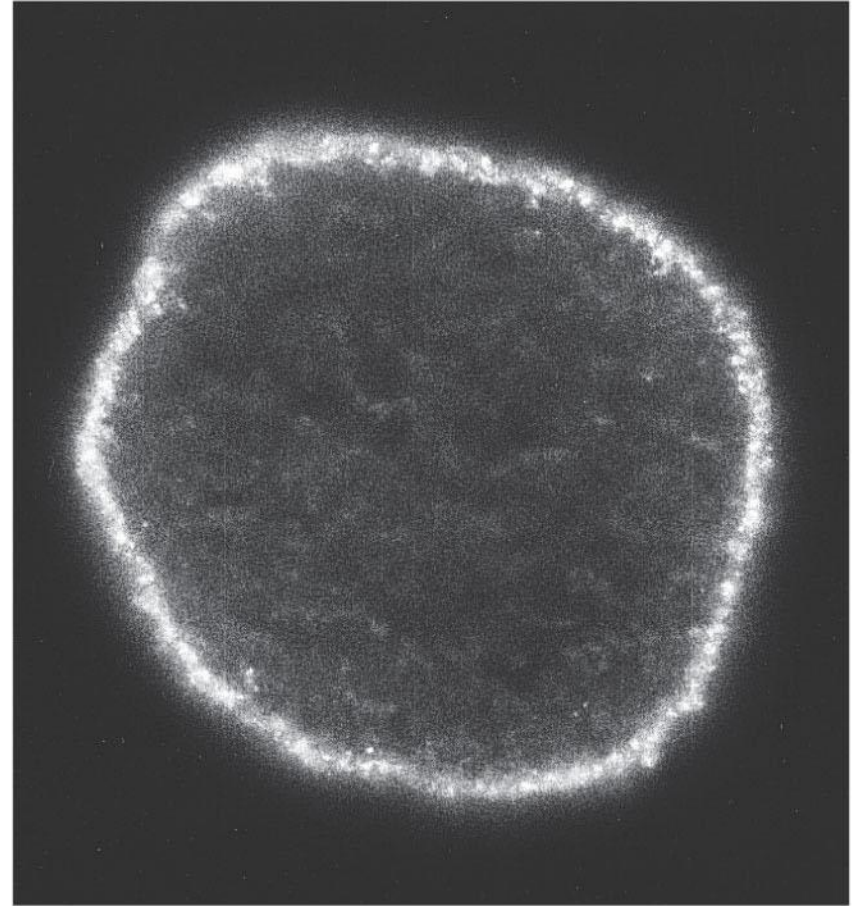
(A)



Cortical granule

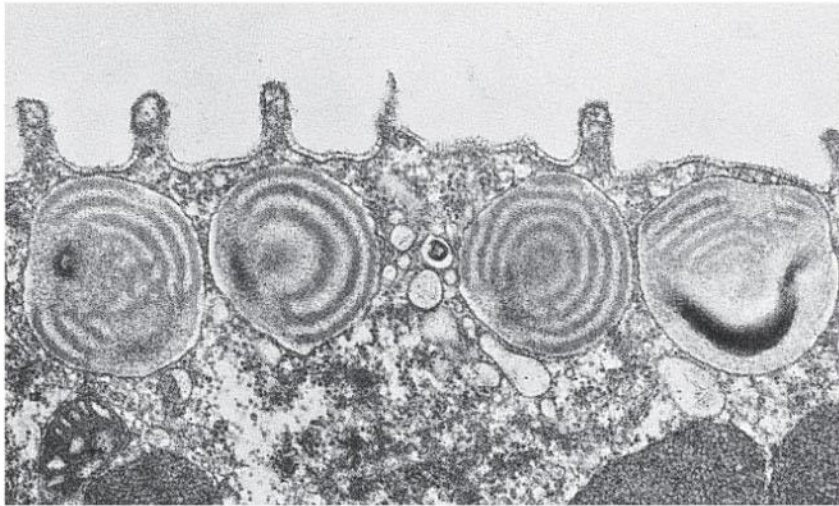
Endoplasmic reticulum

(B)

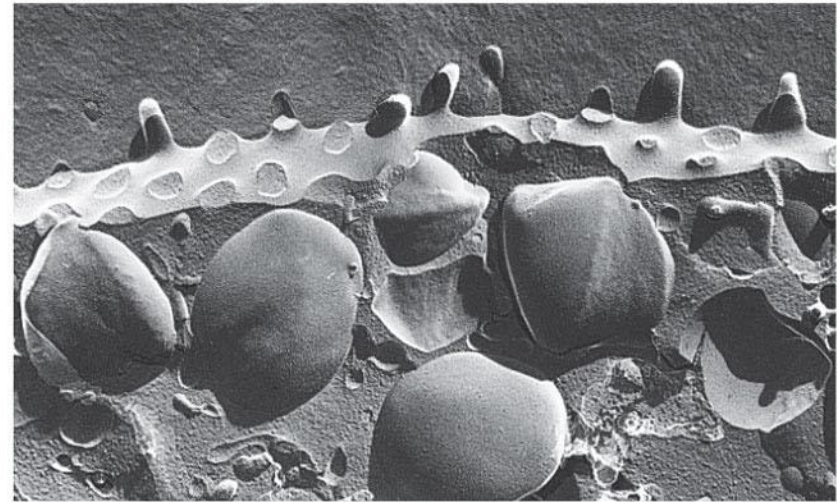


Canais Ca²⁺ dependentes

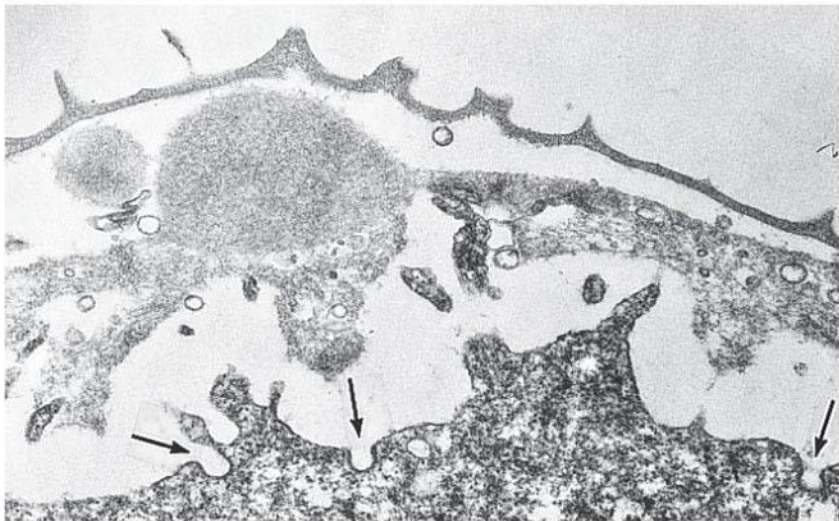
(B)



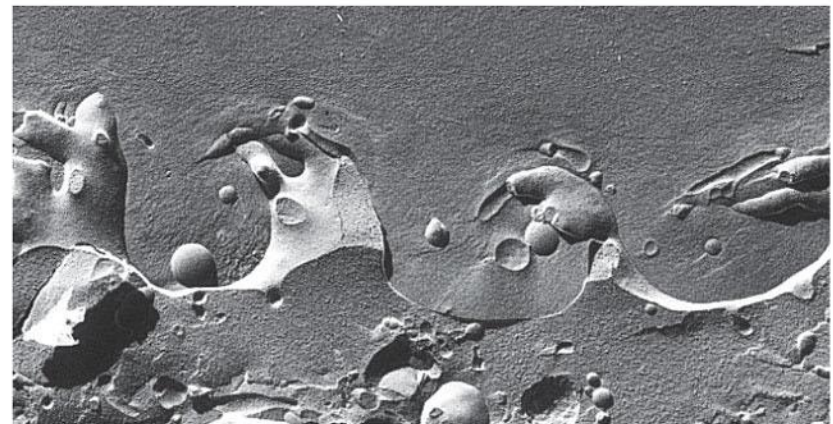
(C)



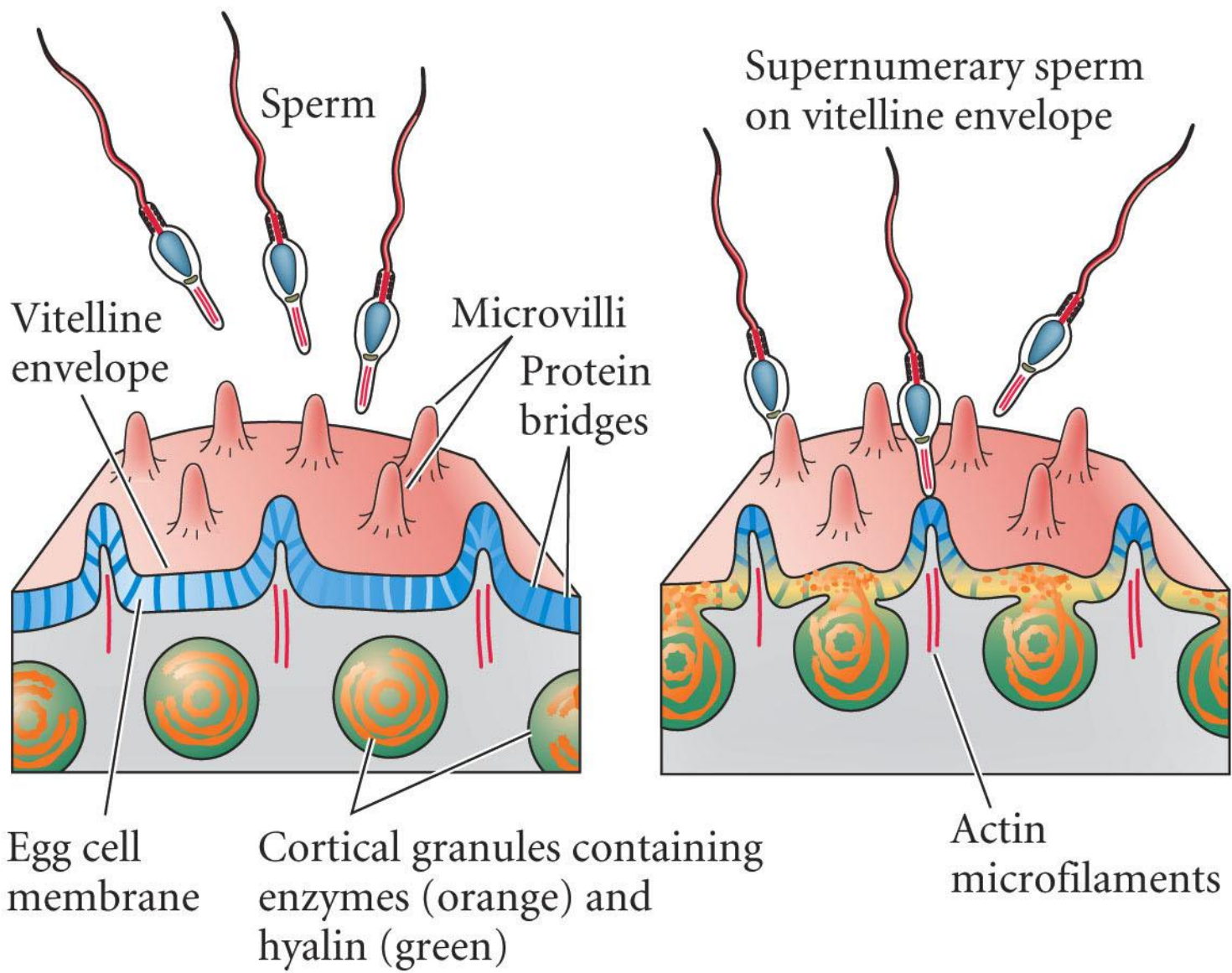
(D)

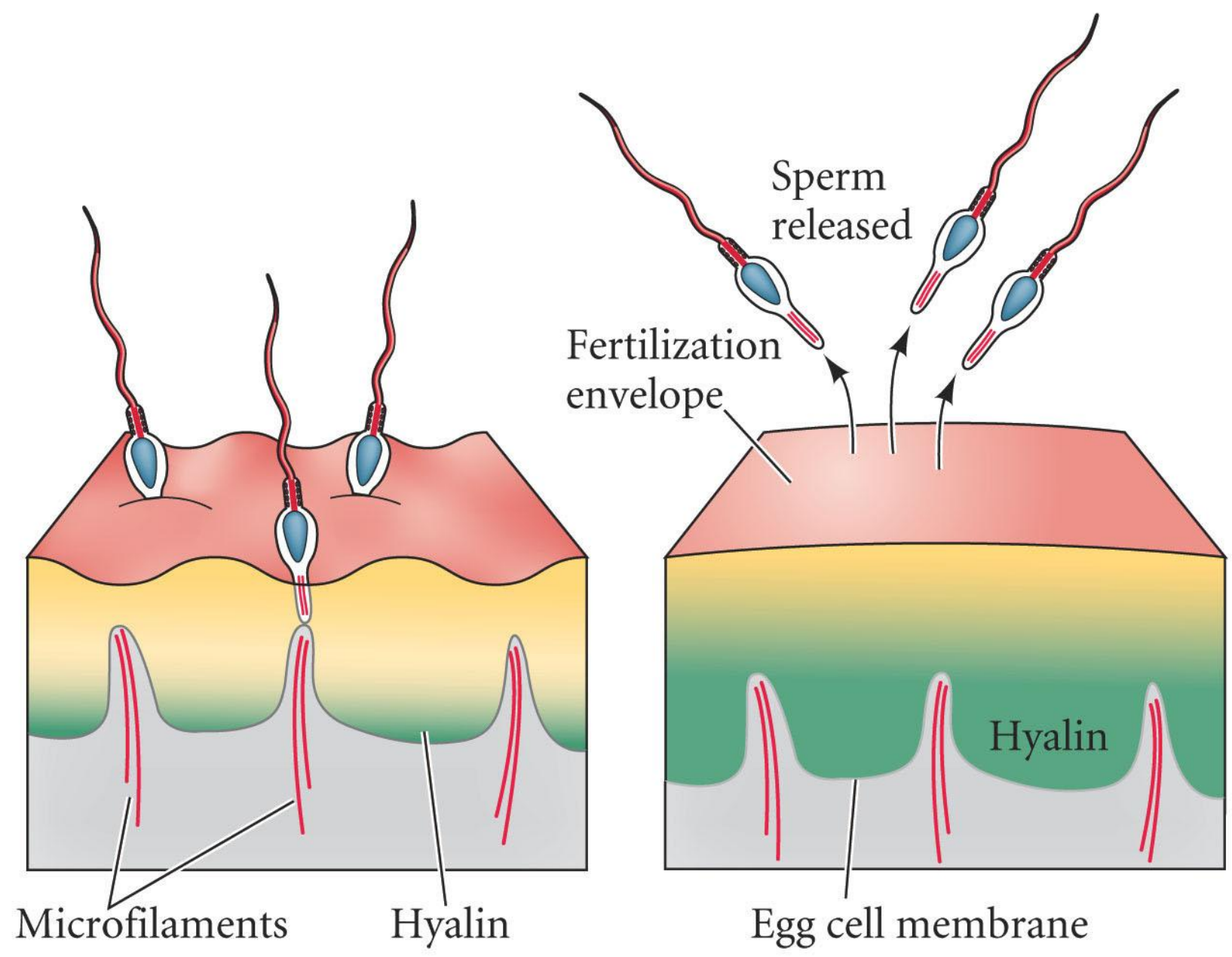


(E)



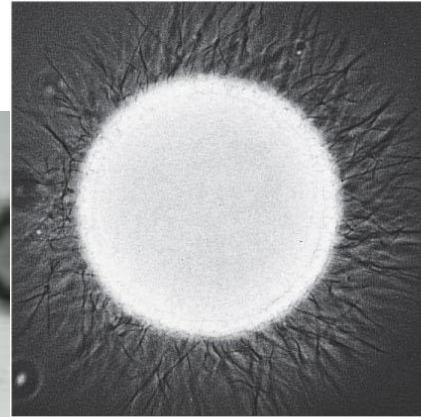
(A)



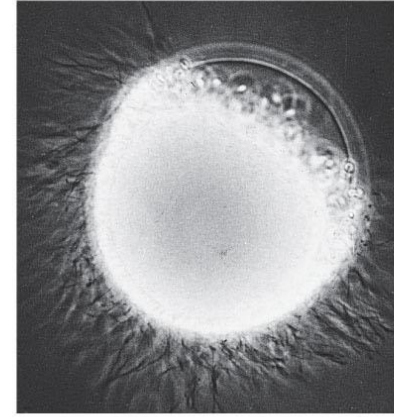




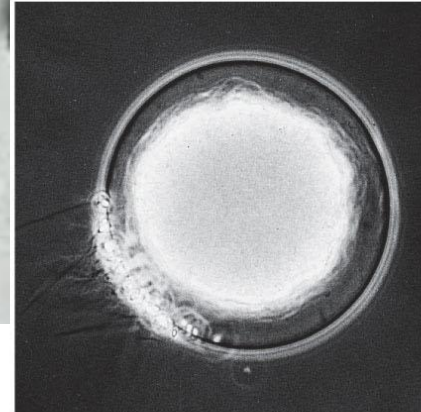
(A)



(B)



(C)



(D)

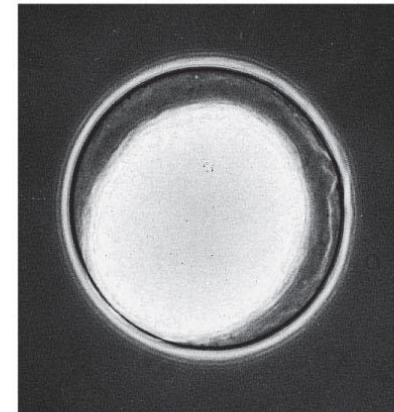
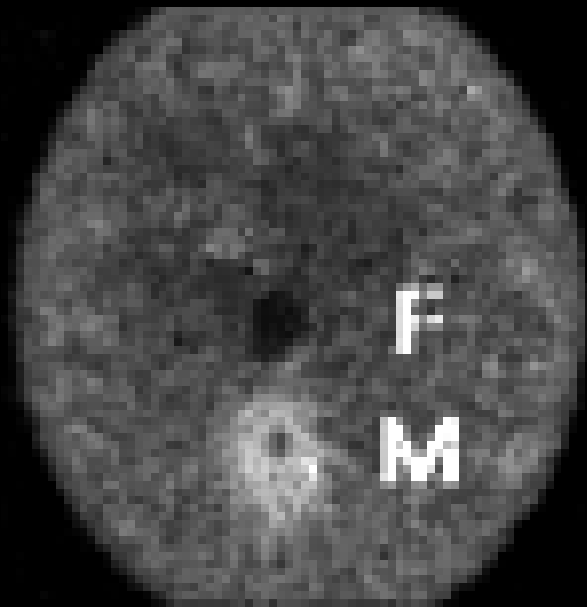


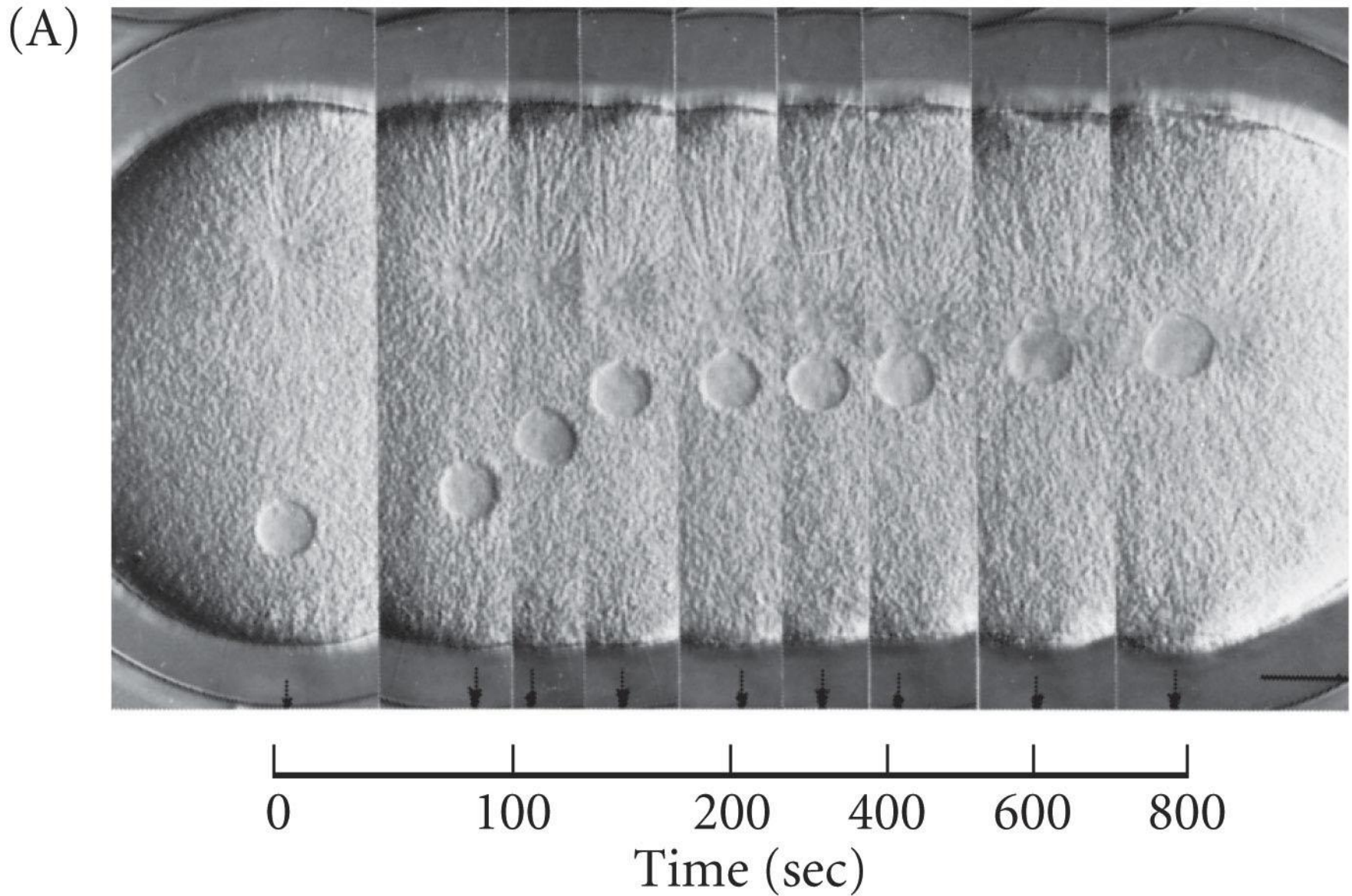
TABLE 7.1 Events of sea urchin fertilization

Event	Approximate time postinsemination ^a
EARLY RESPONSES	
Sperm-egg binding	0 seconds
Fertilization potential rise (fast block to polyspermy)	within 1 sec
Sperm-egg membrane fusion	within 1 sec
Calcium increase first detected	10 sec
Cortical granule exocytosis (slow block to polyspermy)	15–60 sec
LATE RESPONSES	
Activation of NAD kinase	starts at 1 min
Increase in NADP ⁺ and NADPH	starts at 1 min
Increase in O ₂ consumption	starts at 1 min
Sperm entry	1–2 min
Acid efflux	1–5 min
Increase in pH (remains high)	1–5 min
Sperm chromatin decondensation	2–12 min
Sperm nucleus migration to egg center	2–12 min
Egg nucleus migration to sperm nucleus	5–10 min
Activation of protein synthesis	starts at 5–10 min
Activation of amino acid transport	starts at 5–10 min
Initiation of DNA synthesis	20–40 min
Mitosis	60–80 min
First cleavage	85–95 min

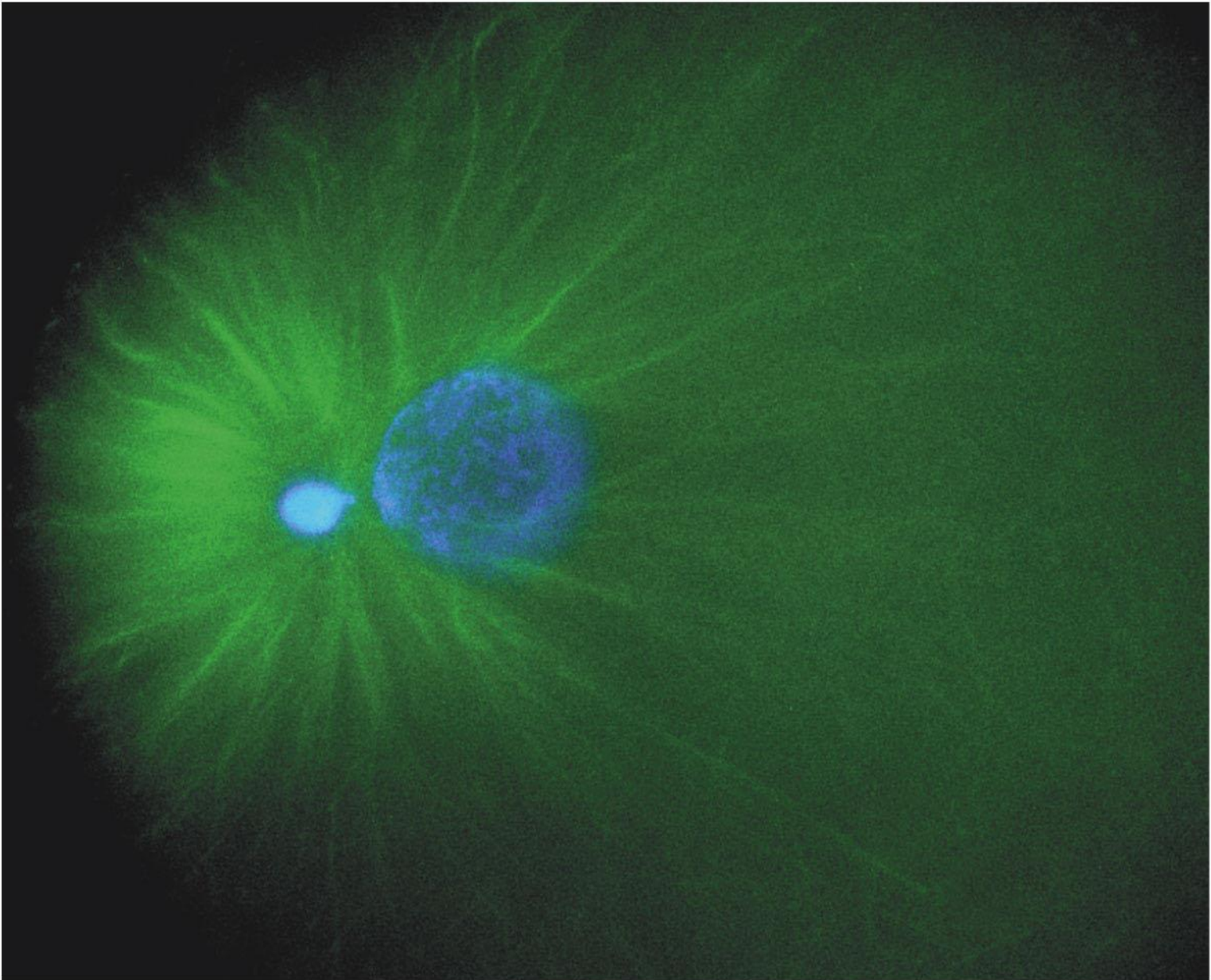
Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

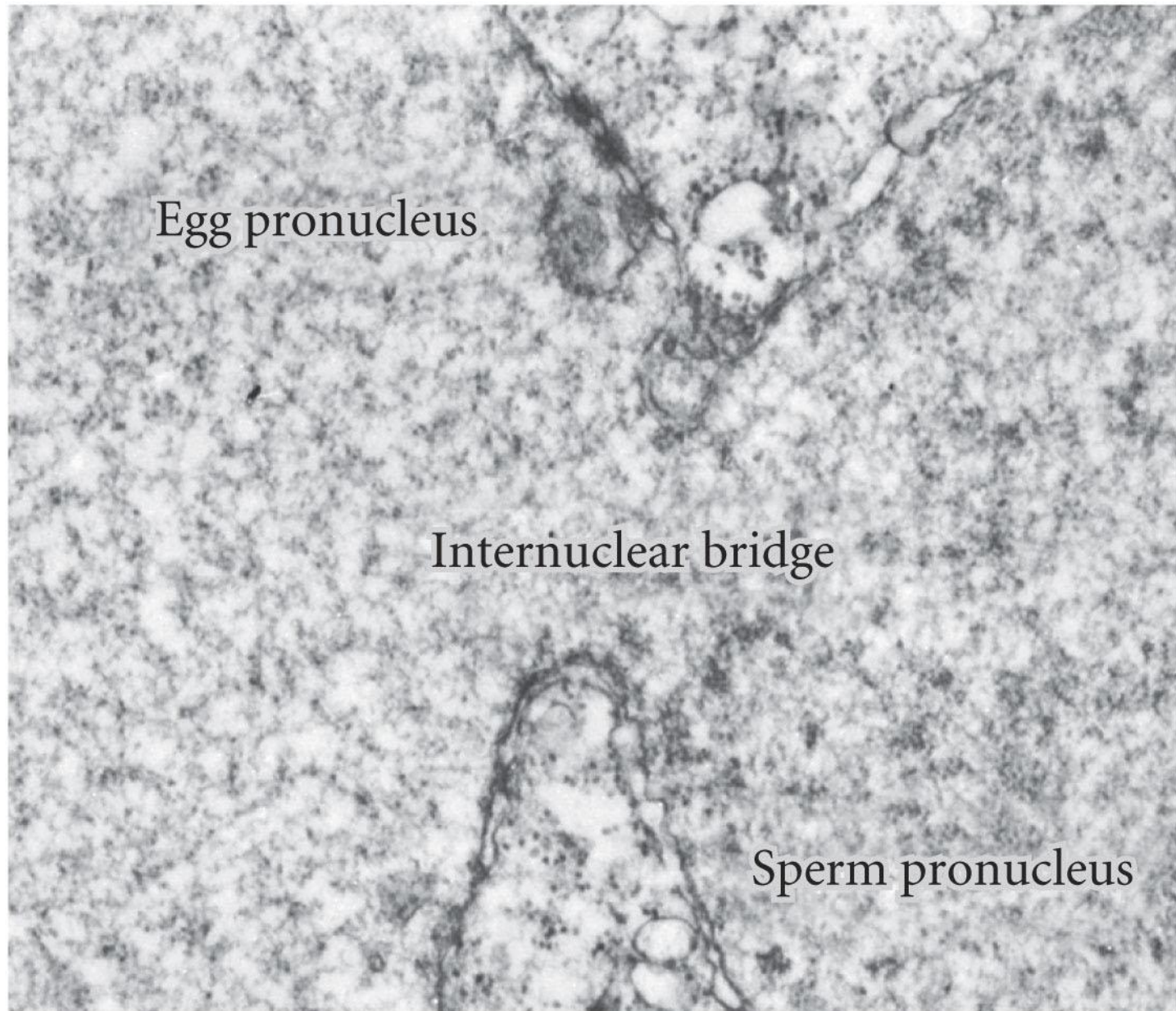


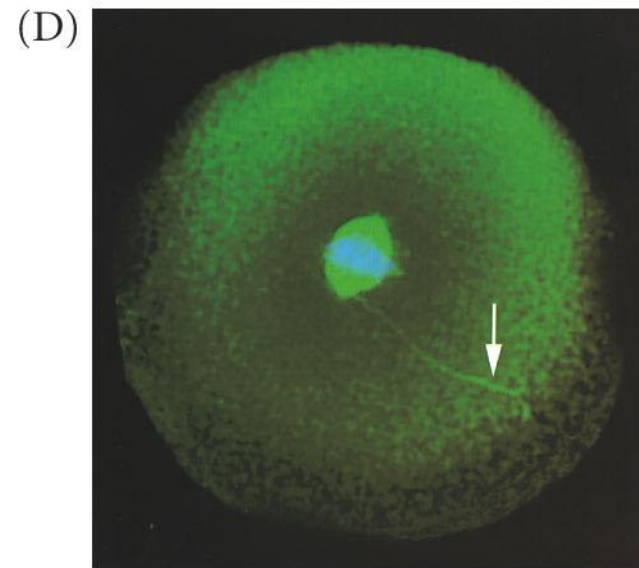
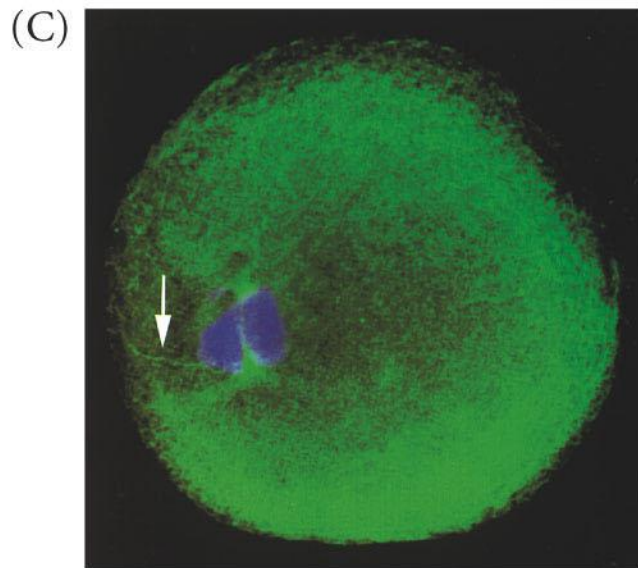
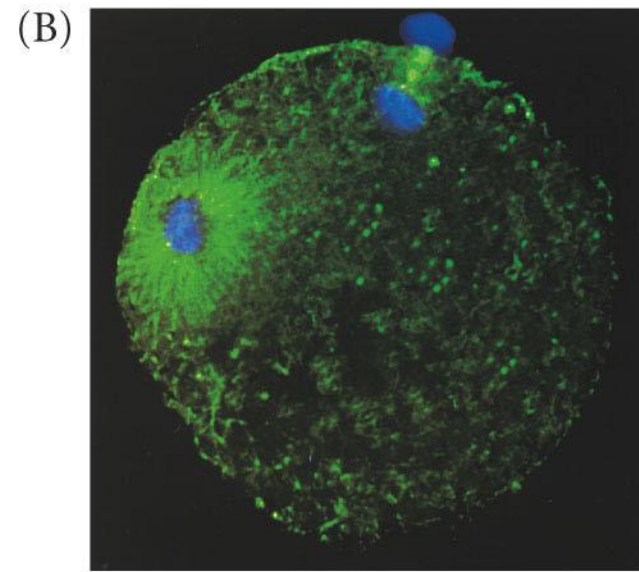
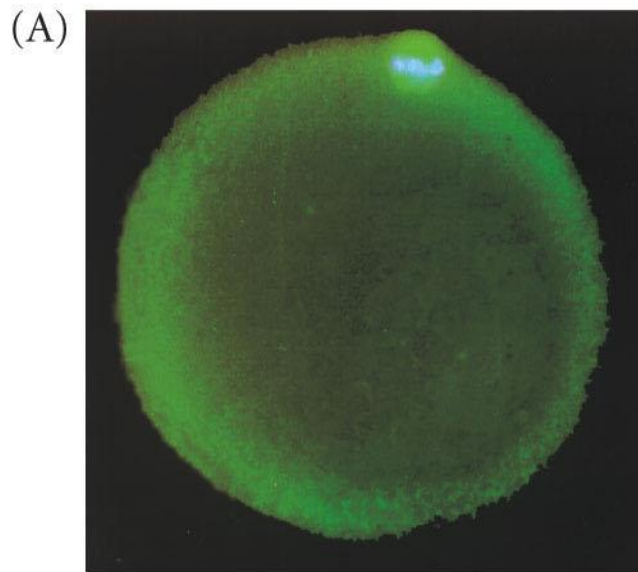


(B)



(C)





Fusão de pró-núcleos

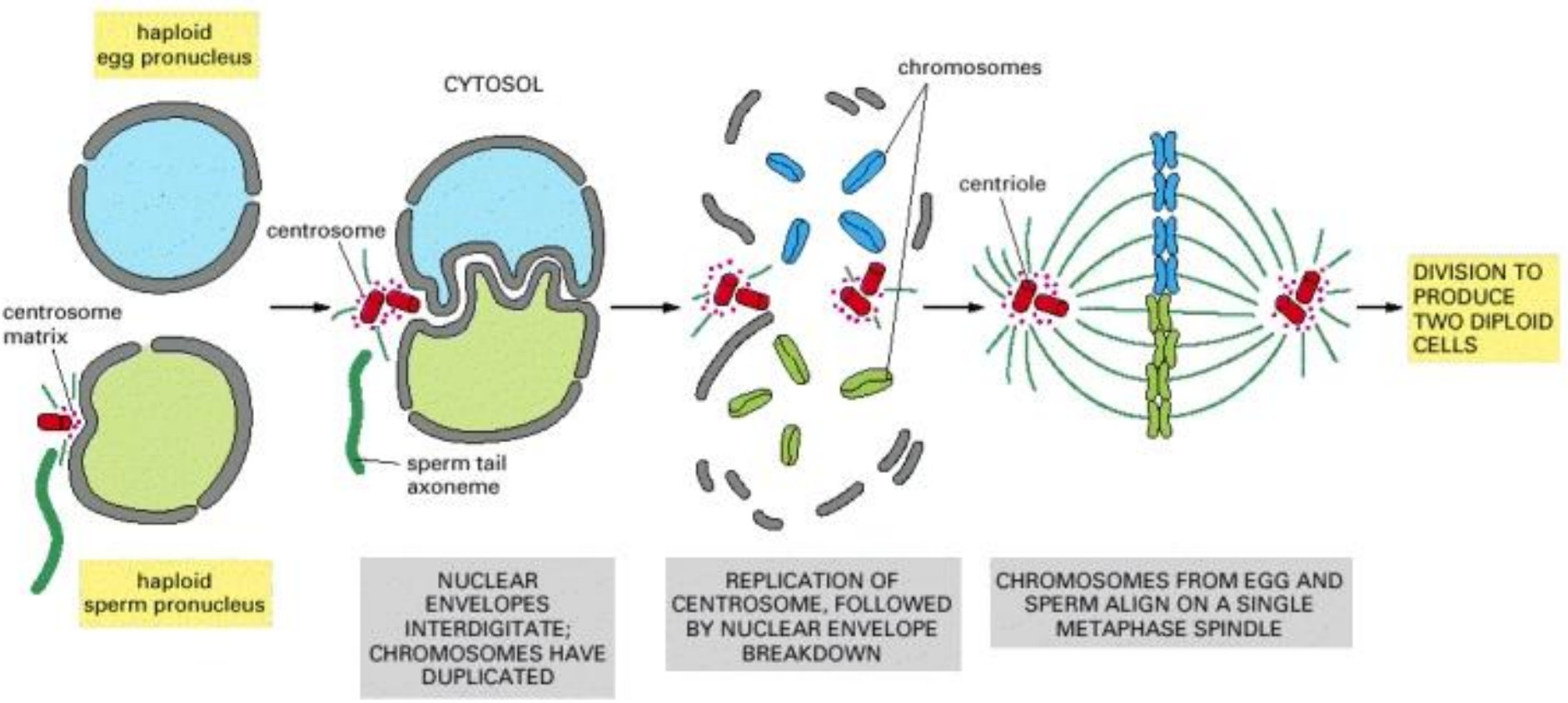


TABLE 7.1 Events of sea urchin fertilization

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Activation of protein synthesis	starts at 5–10 min
Activation of amino acid transport	starts at 5–10 min
Initiation of DNA synthesis	20–40 min
Mitosis	60–80 min
First cleavage	85–95 min

Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

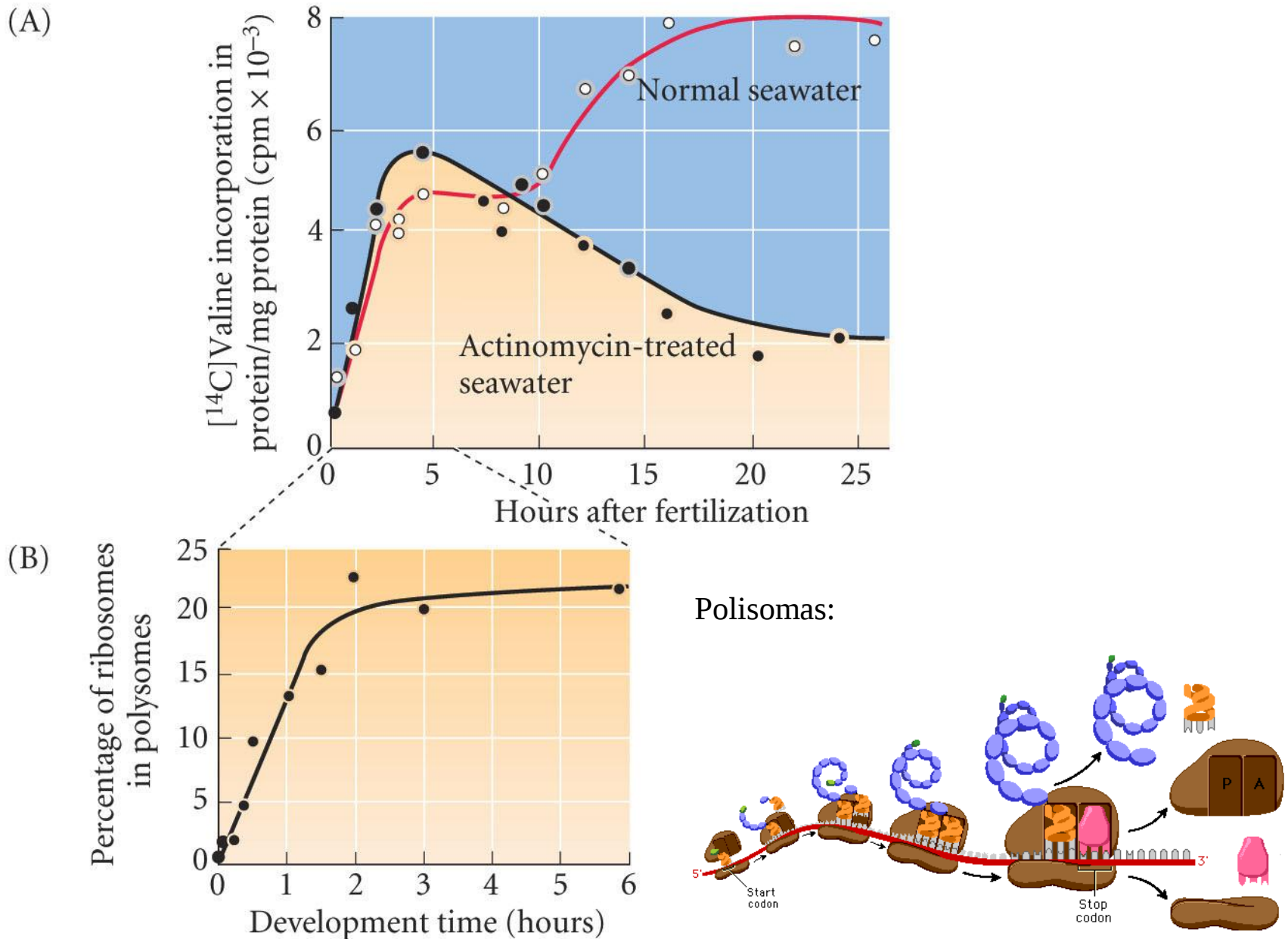


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