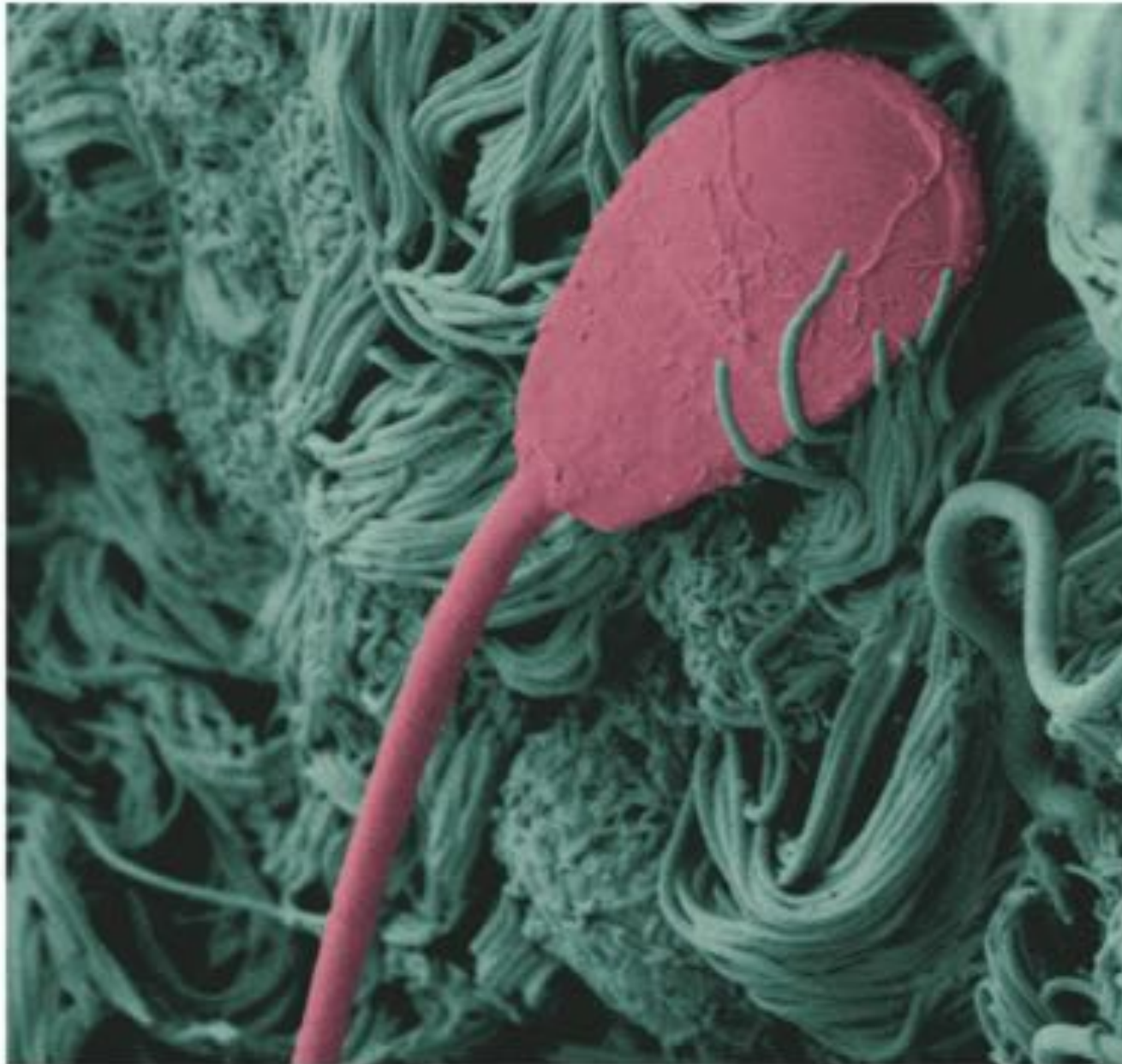
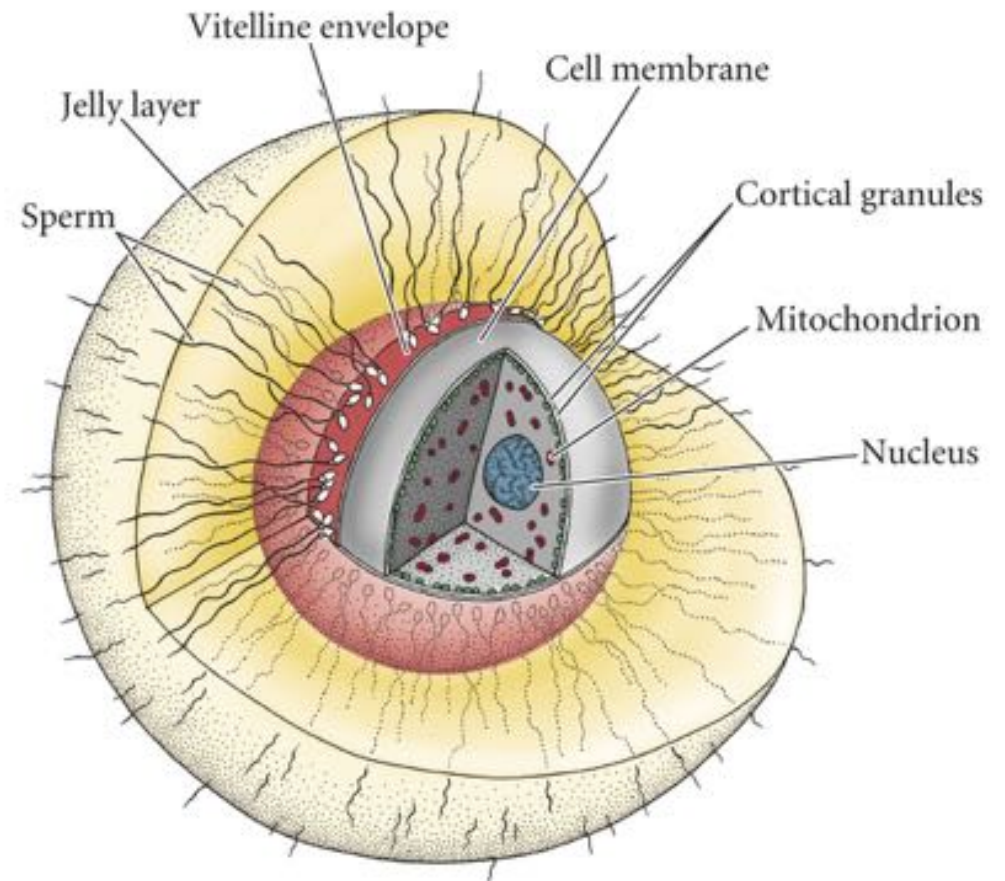


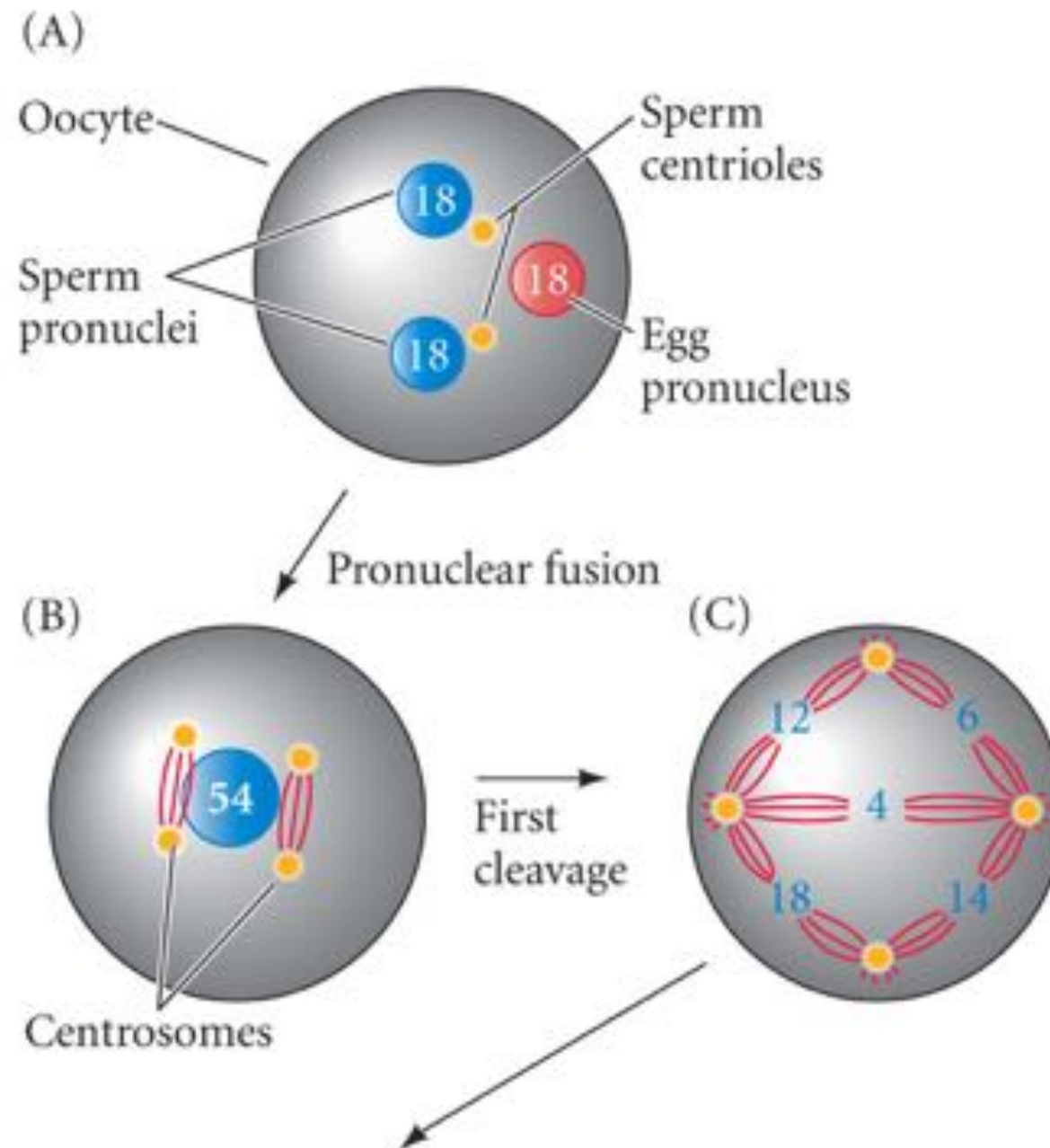
FERTILIZAÇÃO



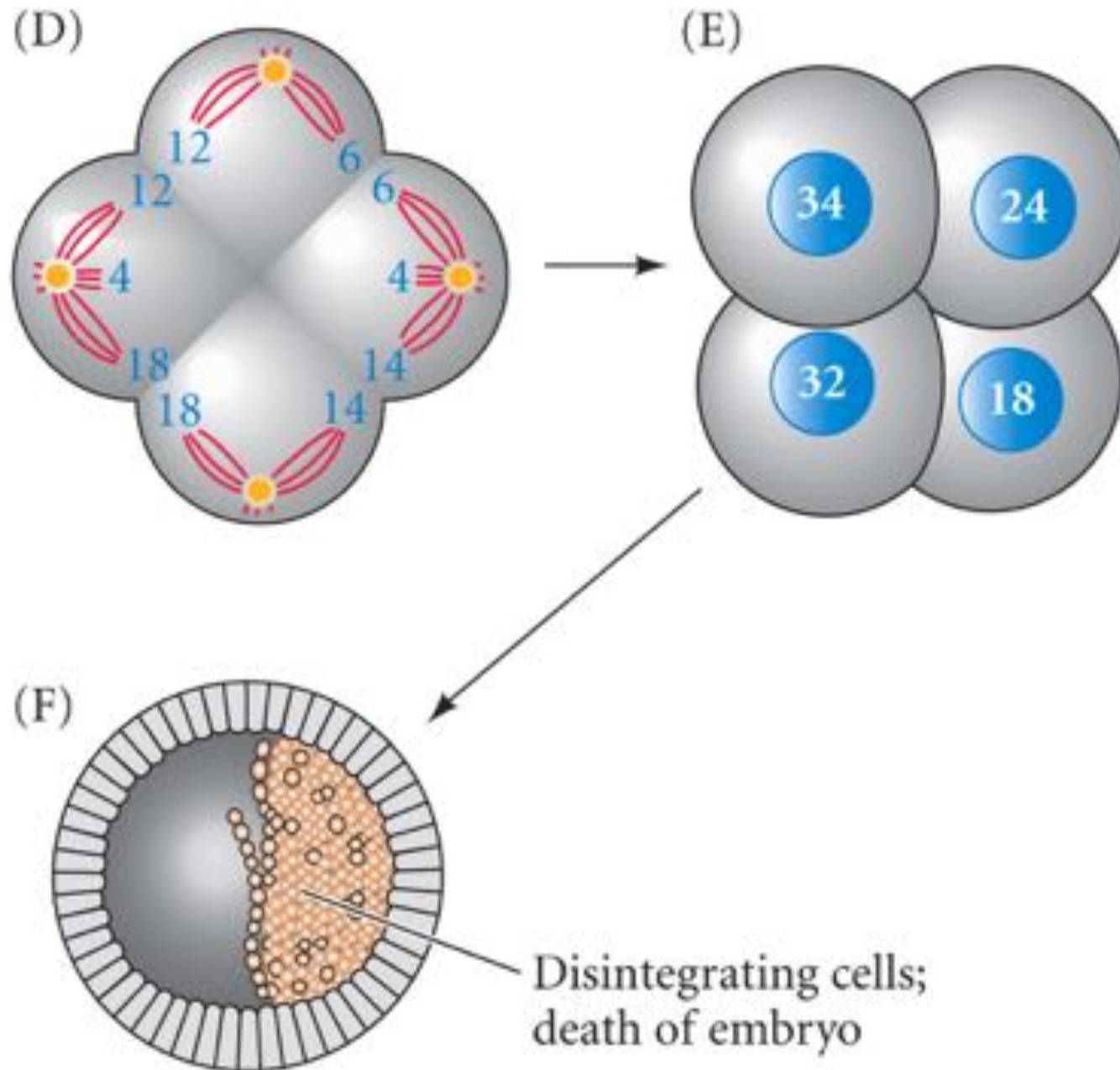


¿O qué ocurre cuándo varios espermatozoides ingresan ao ovo?

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

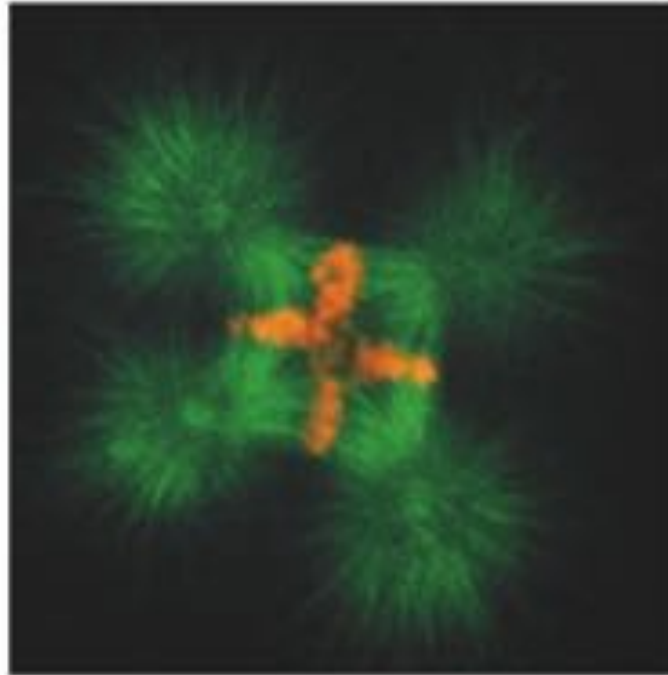


Desenvolvimento aberrante no ovo dispermico de ouriço (Parte 2) - POLISPERMIA



Desenvolvimento aberrante no ovo dispermico de ouriço (Parte 2) - POLISPERMIA

(G)



(H)

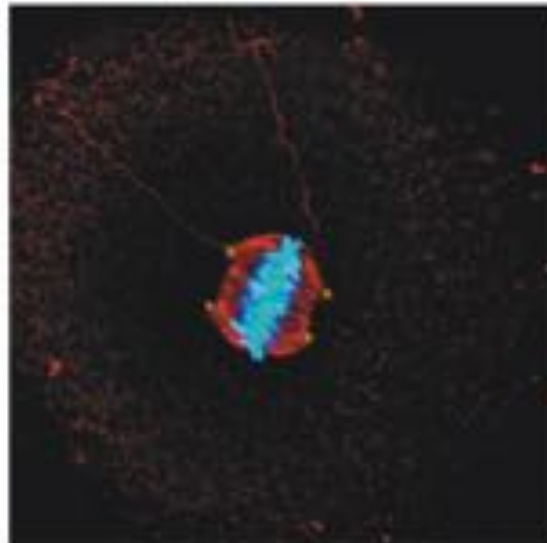


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Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

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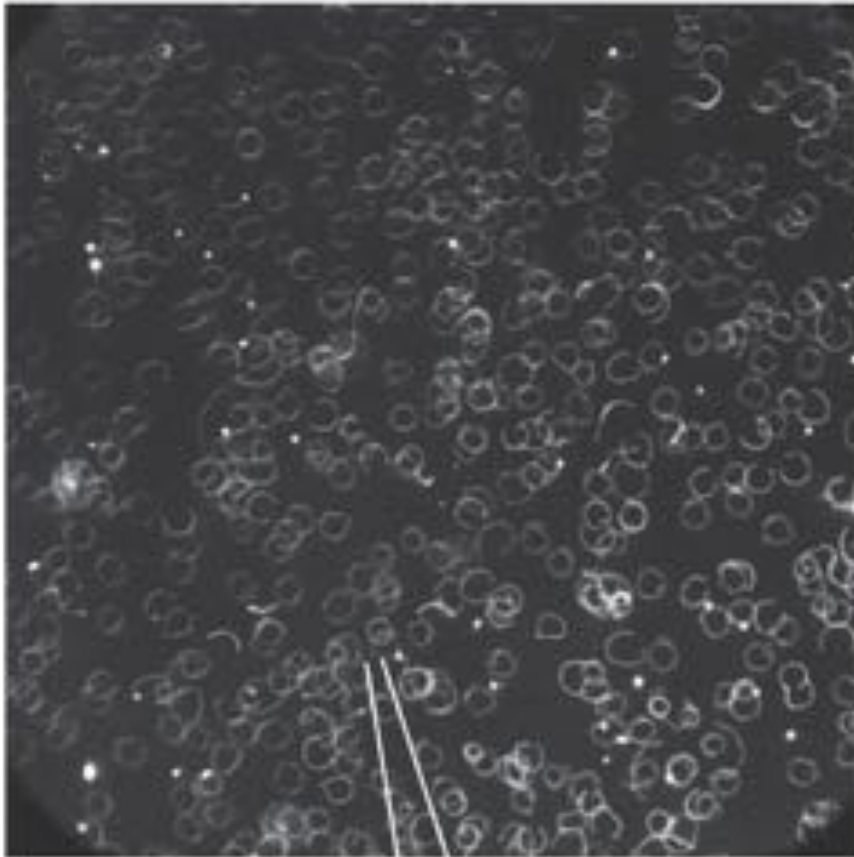
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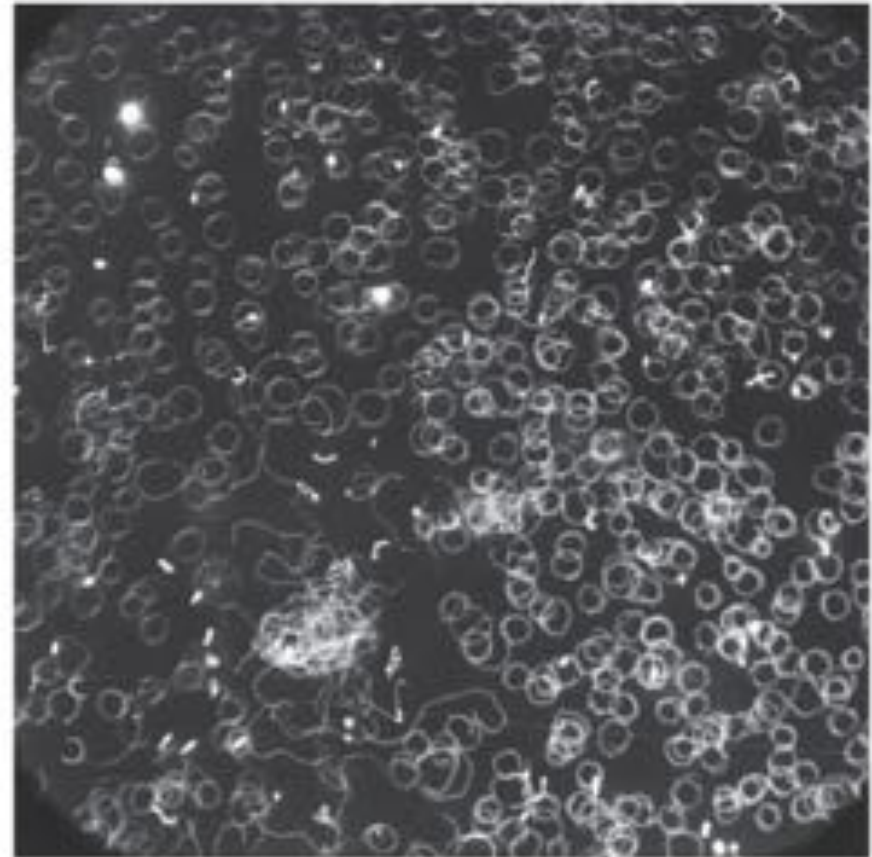
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(A)

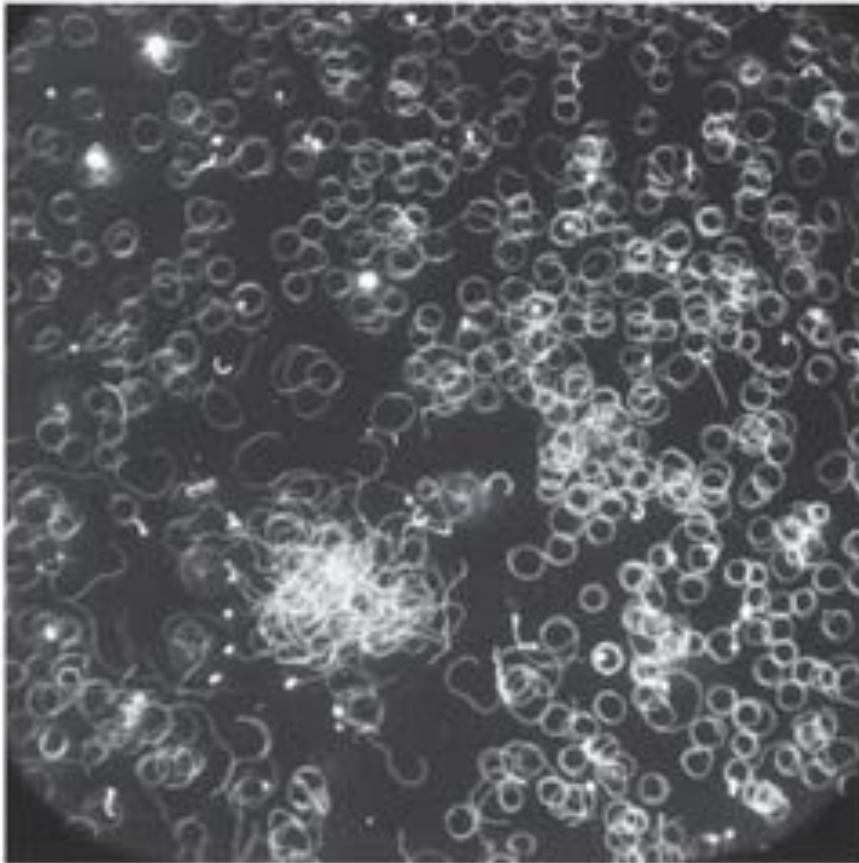


(B)

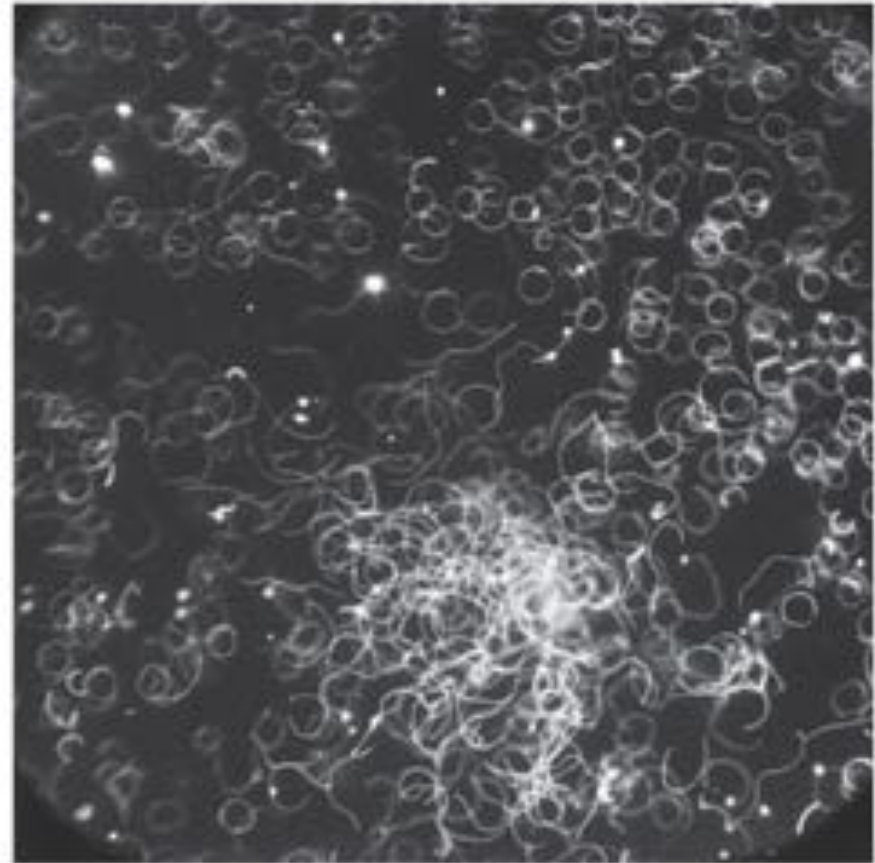


Molécula de quimioatração: resact

(C)



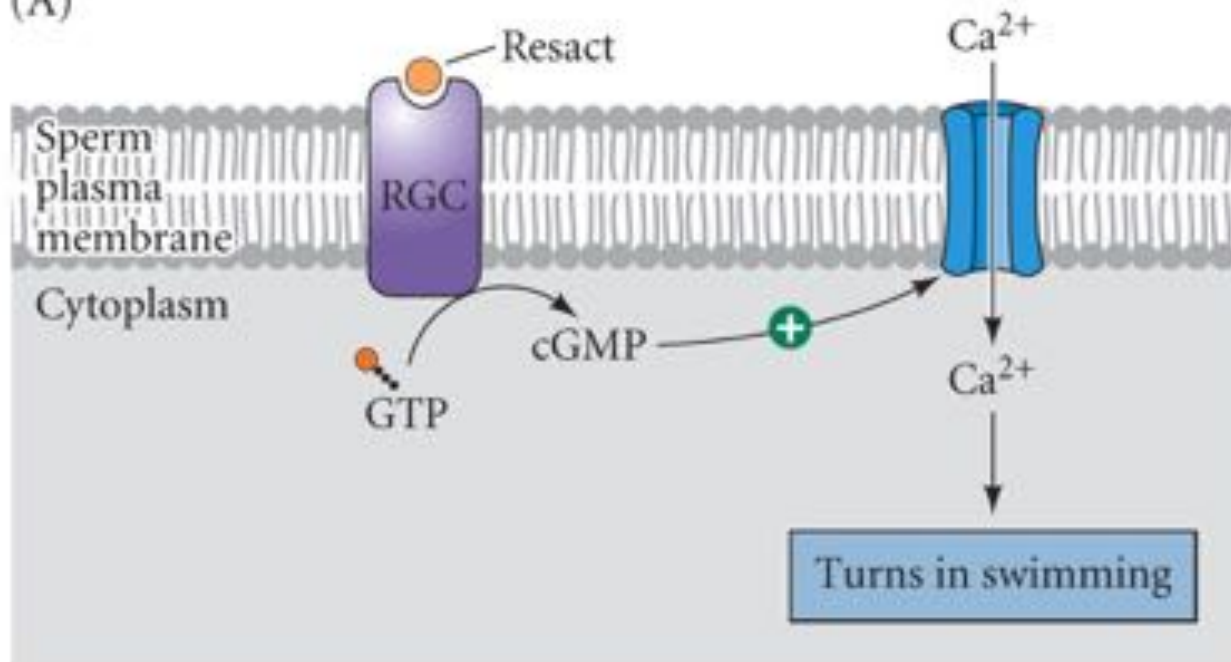
(D)



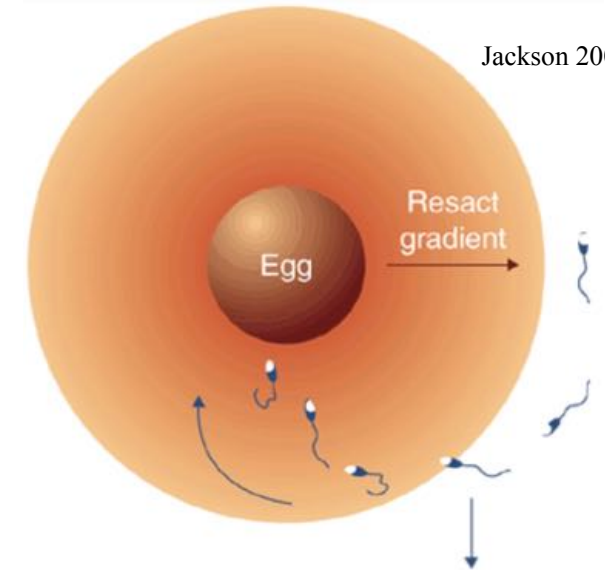
Molécula de quimioatração: resact

Modelo de peptidos de quimiotaxis na esperma de ouriço

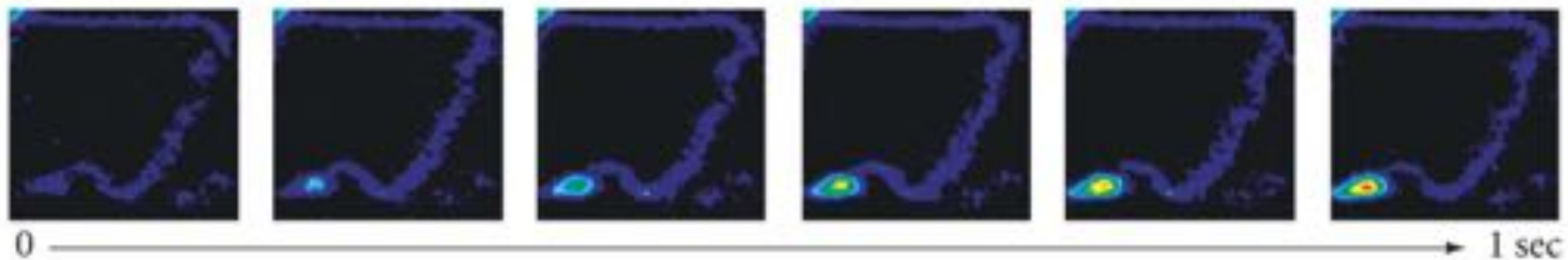
(A)



Jackson 2003



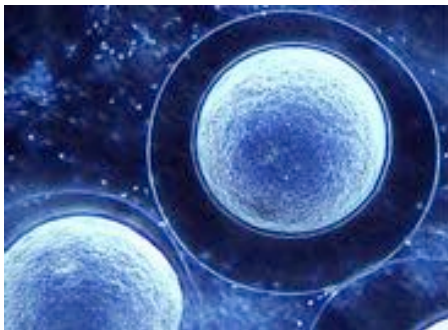
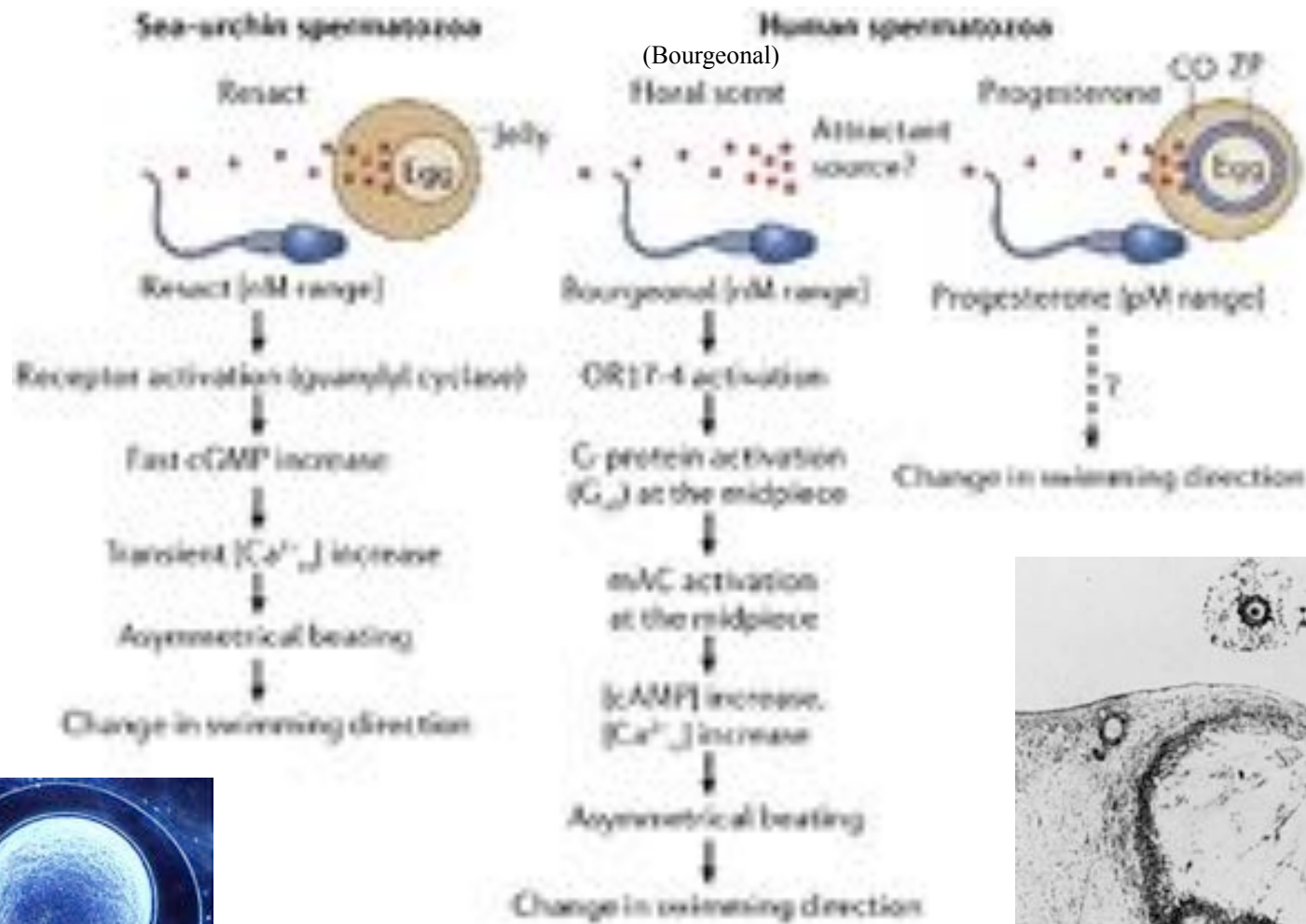
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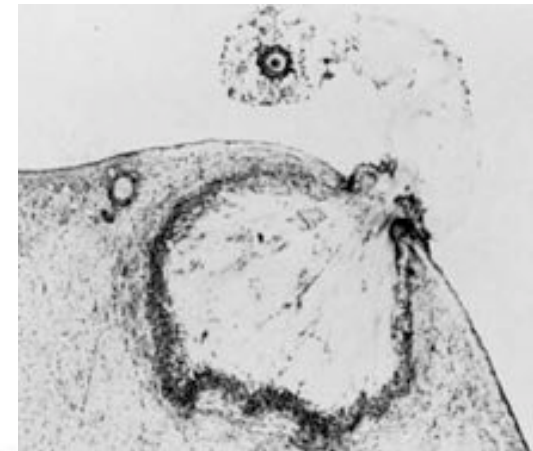
DEVELOPMENTAL BIOLOGY, Eighth Edition, Figure 7.10 © 2005 Sinauer Associates, Inc.

<http://www.youtube.com/watch?v=-uZyfZ2x9Aw>

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

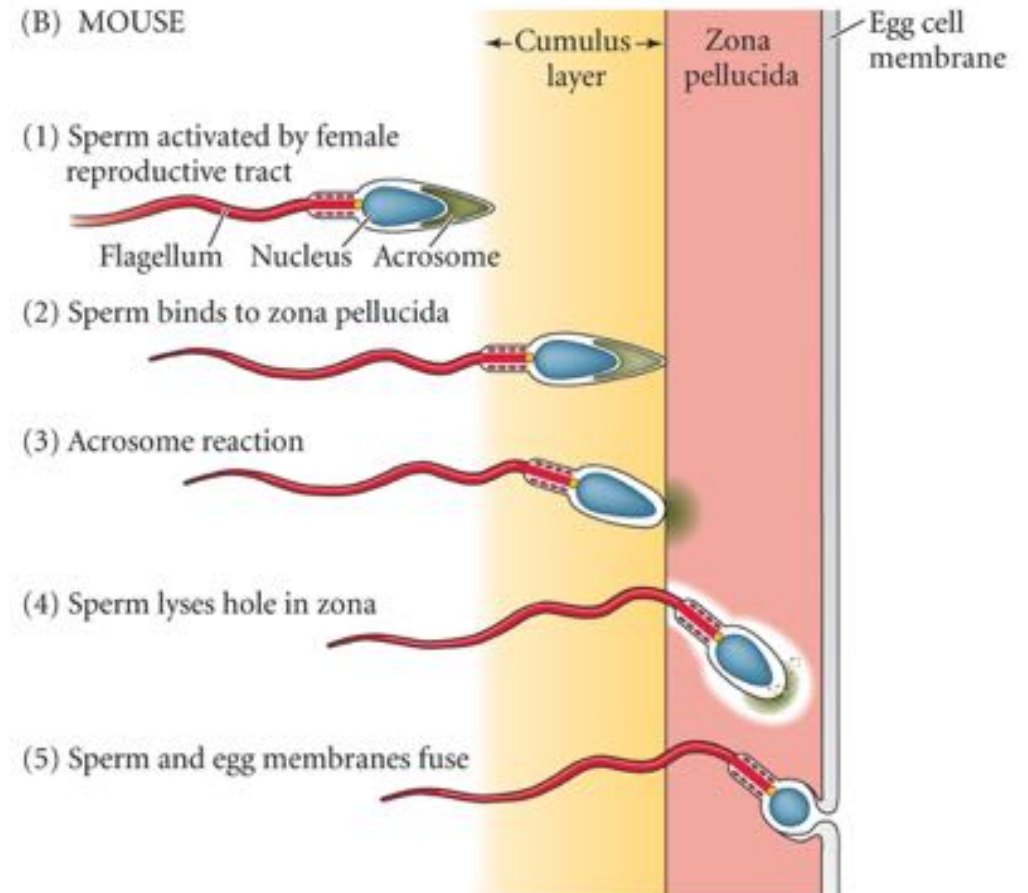
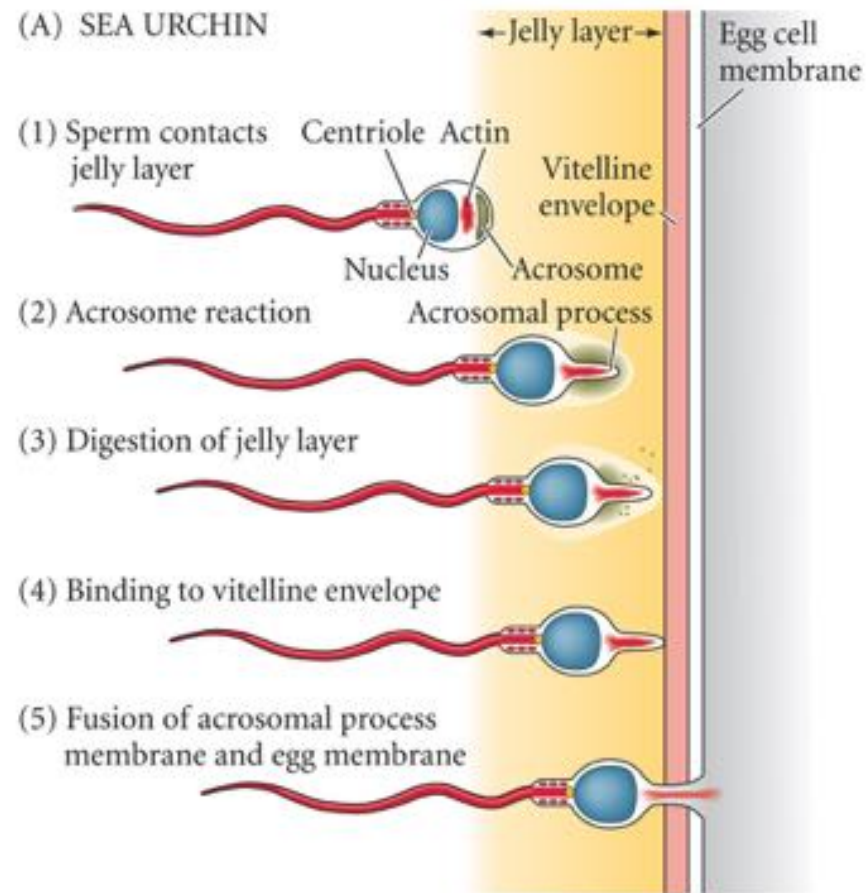
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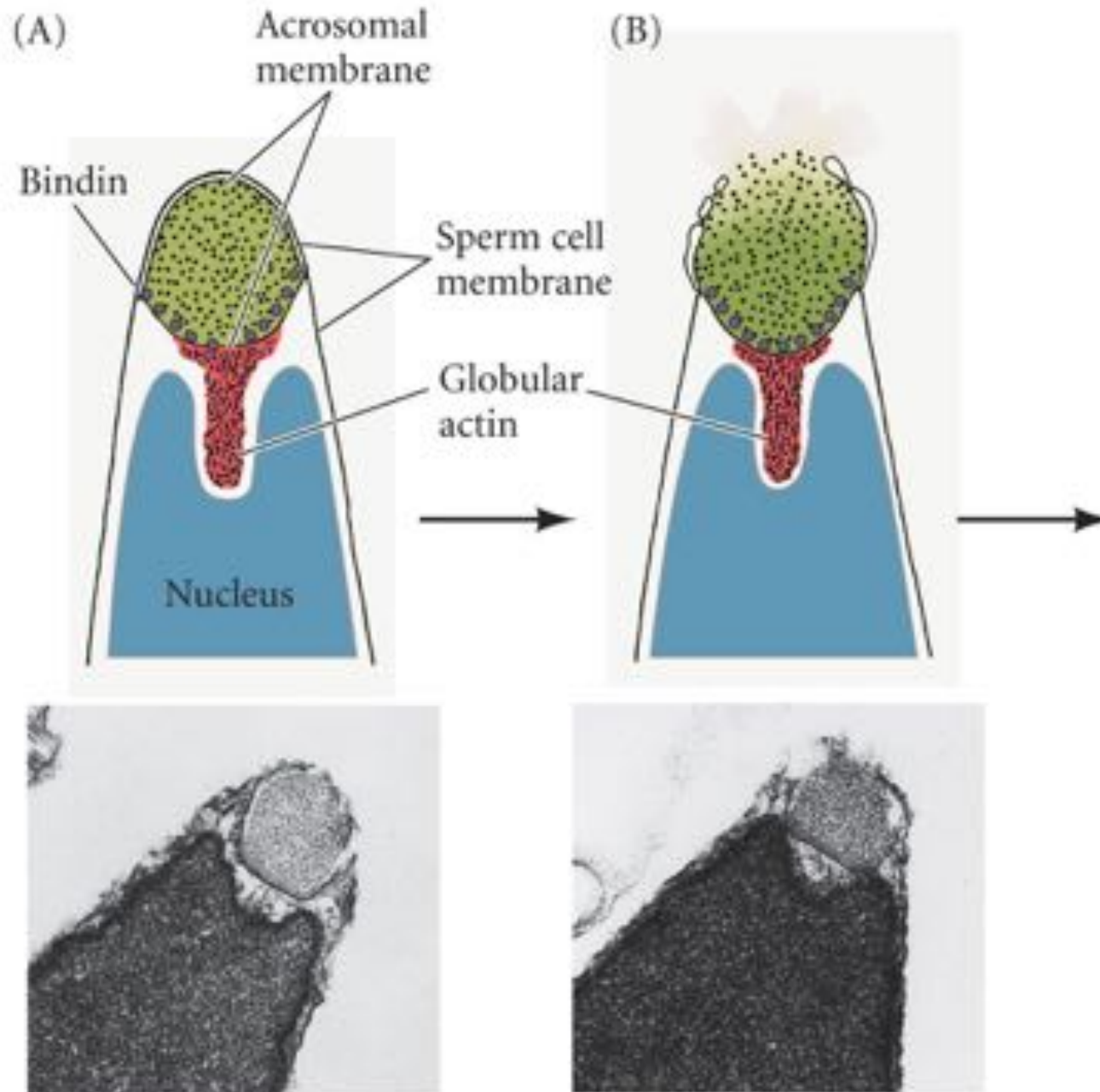
Main sources: Whitaker and Steinhardt 1985; Mohri et al. 1995.

^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.

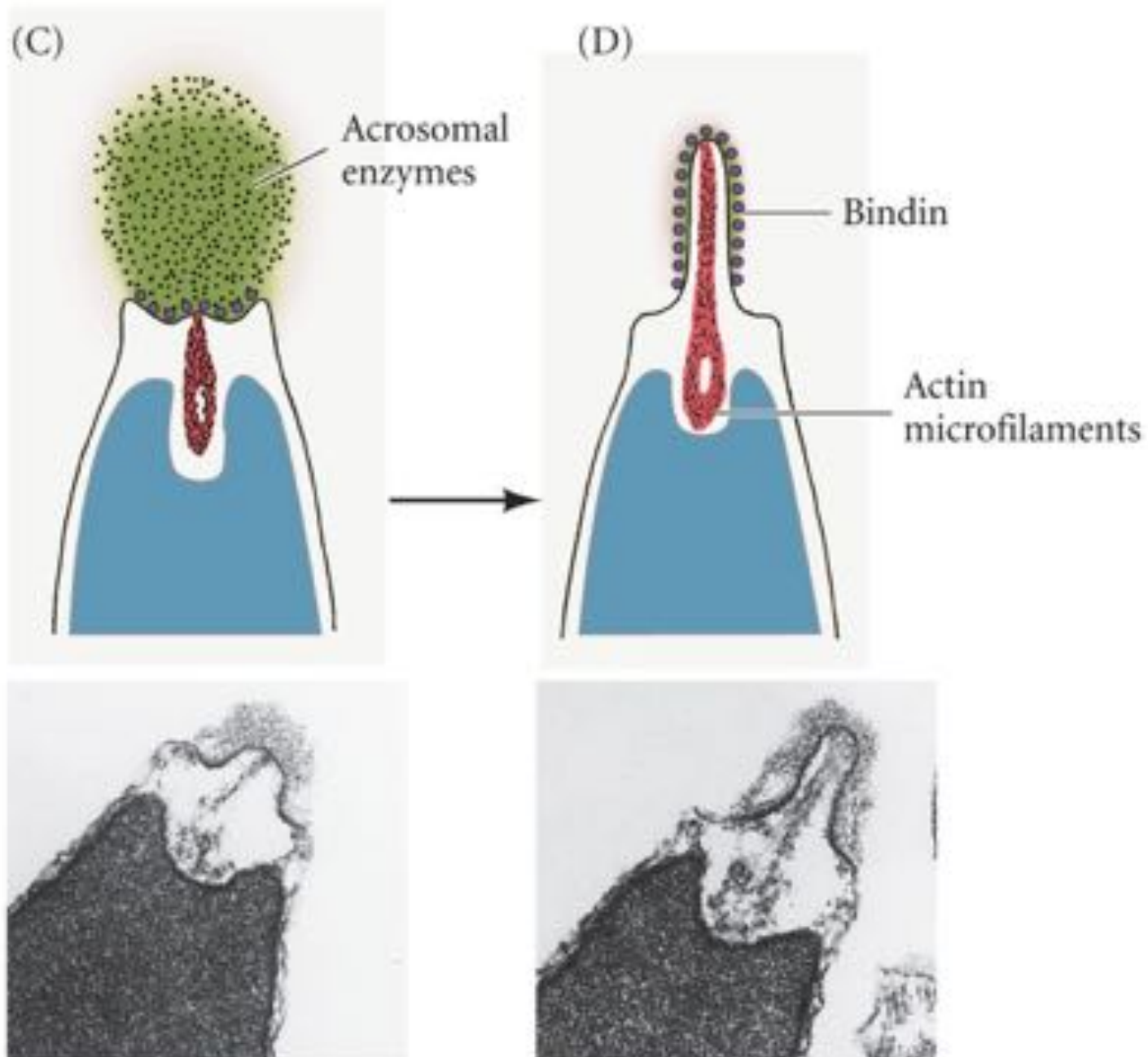
Summary of events leading to fusion of egg & sperm plasma membranes in urchin and mouse



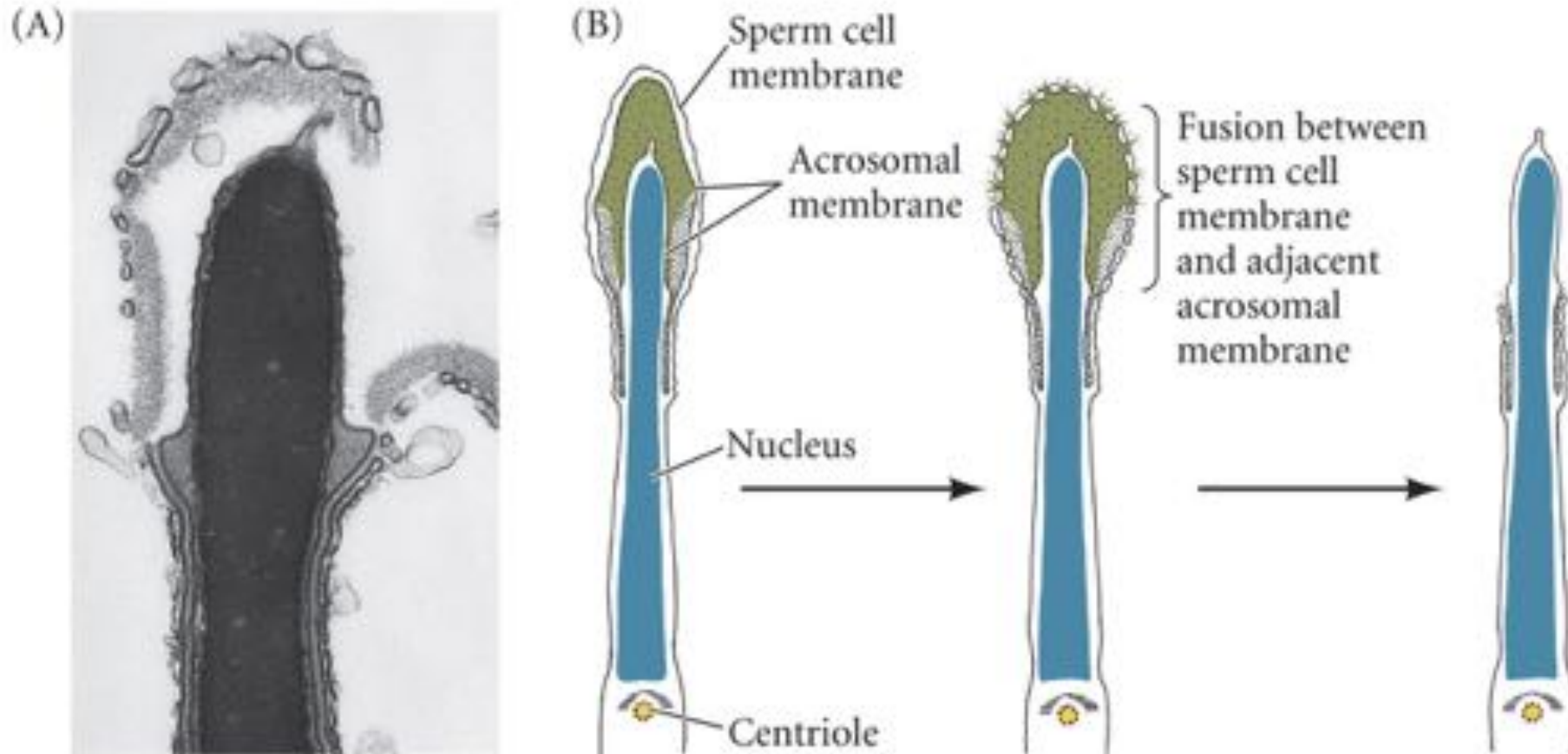
The acrosome reaction in sea urchin sperm (Part 1)



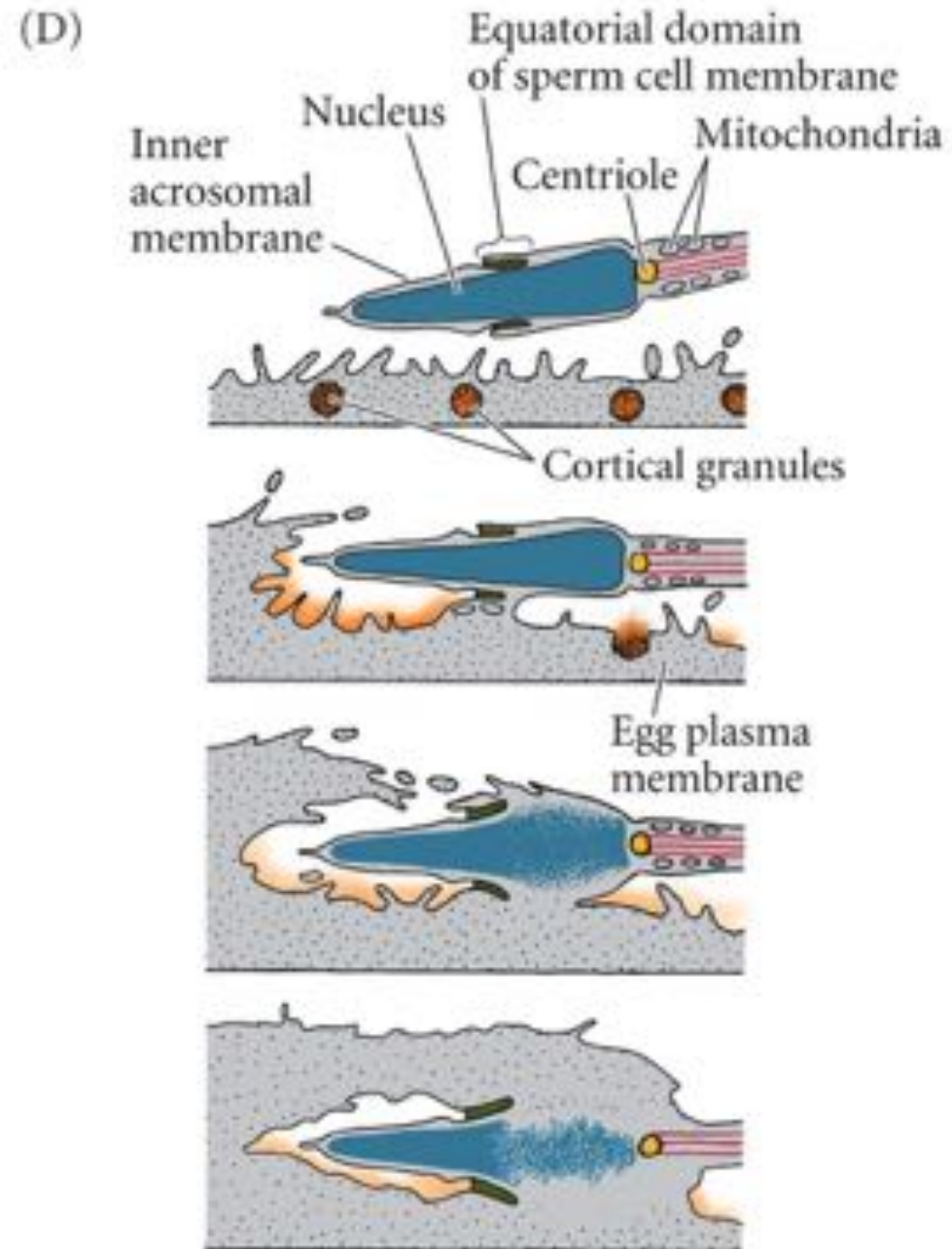
The acrosome reaction in sea urchin sperm (Part 2)



The acrosome reaction in hamster sperm

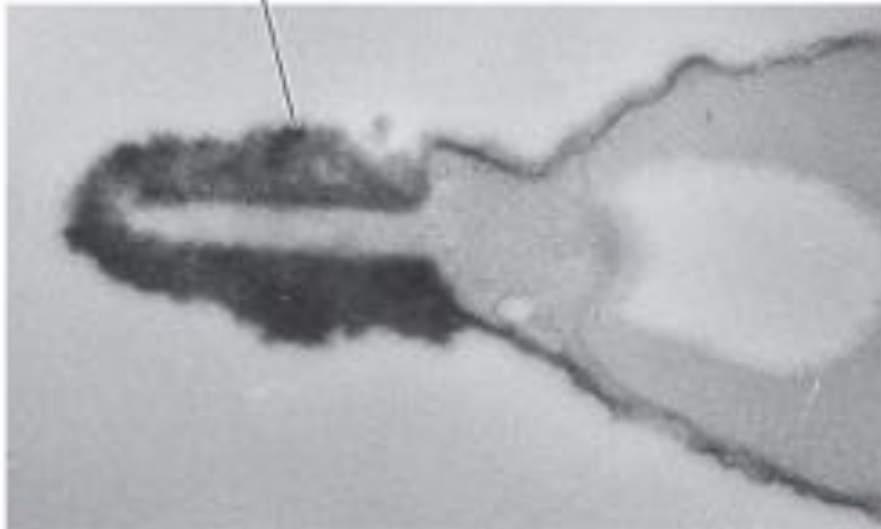


Entry of sperm into a golden hamster egg (Part 2)

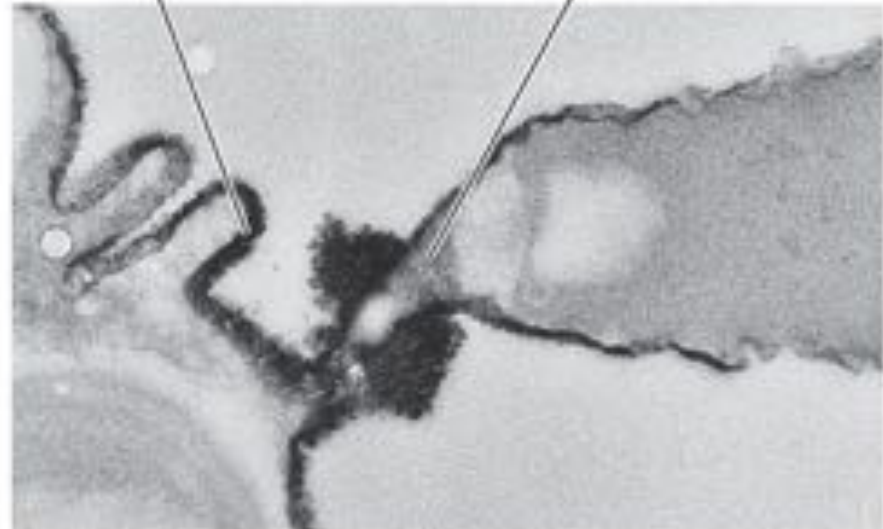


Localization of bindin on the acrosomal process (Part 2)

(B) Bindin



(C) Vitelline envelope of egg Acrosomal process

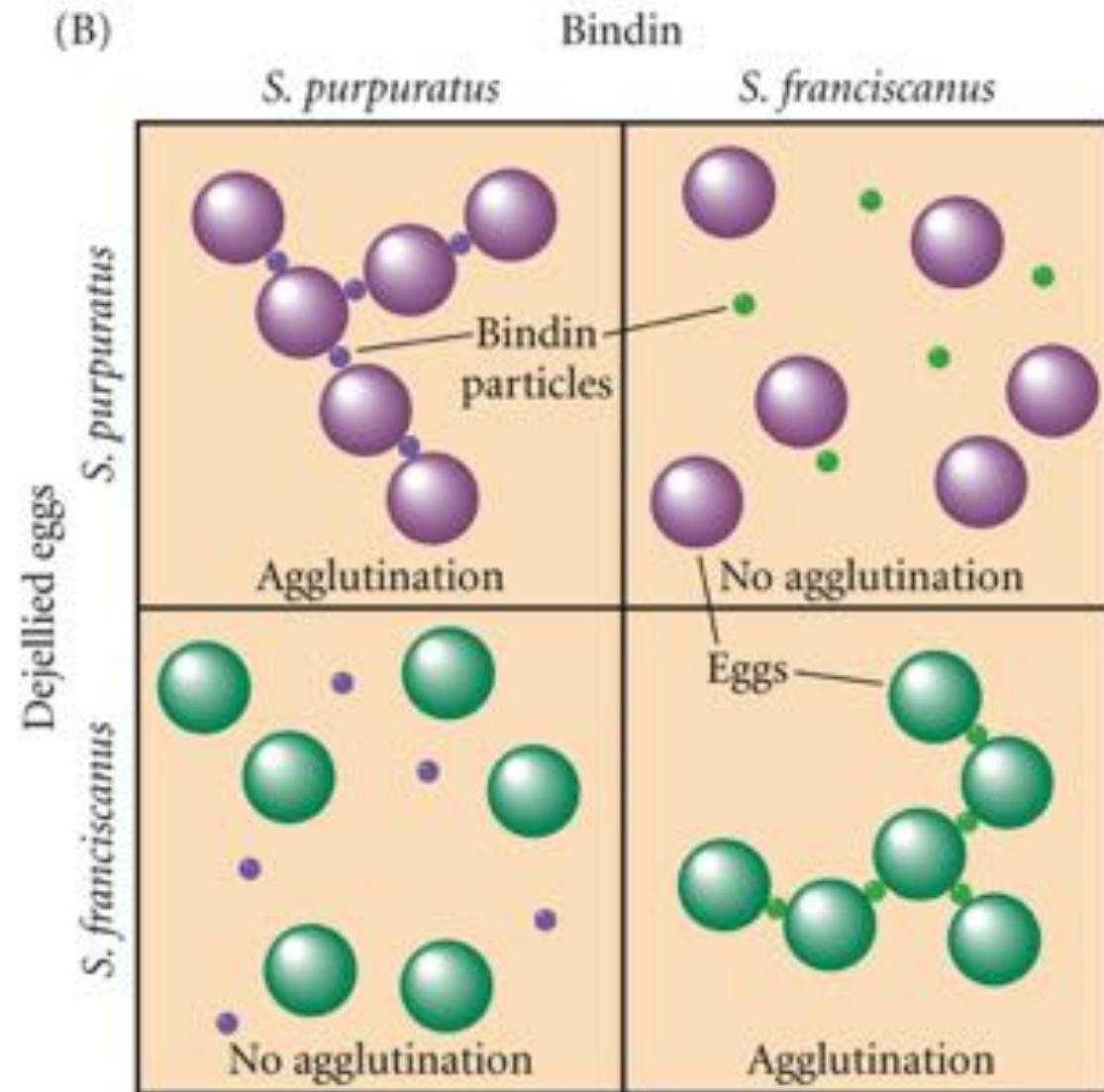


Species-specific binding of acrosomal process to egg surface in sea urchins

(A)



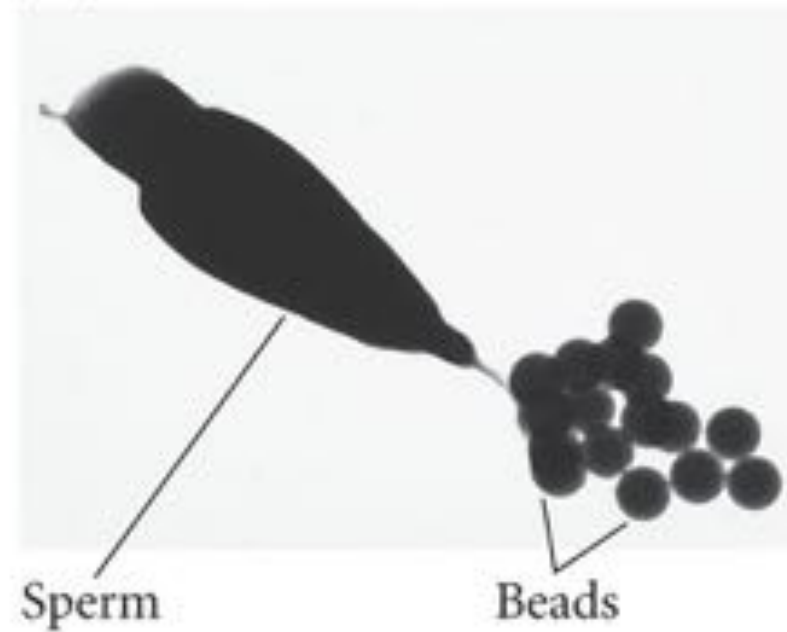
(B)



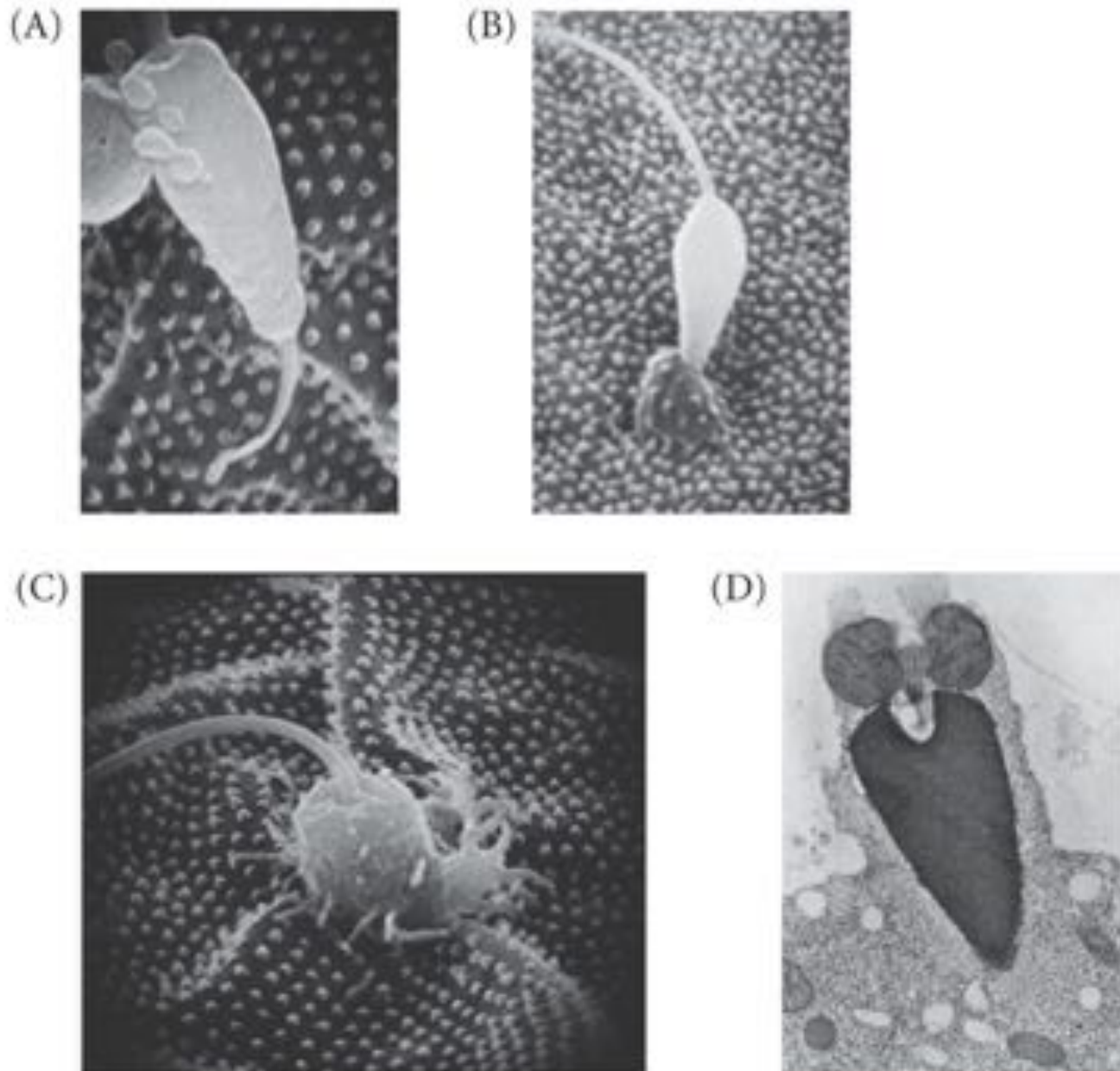
(A)



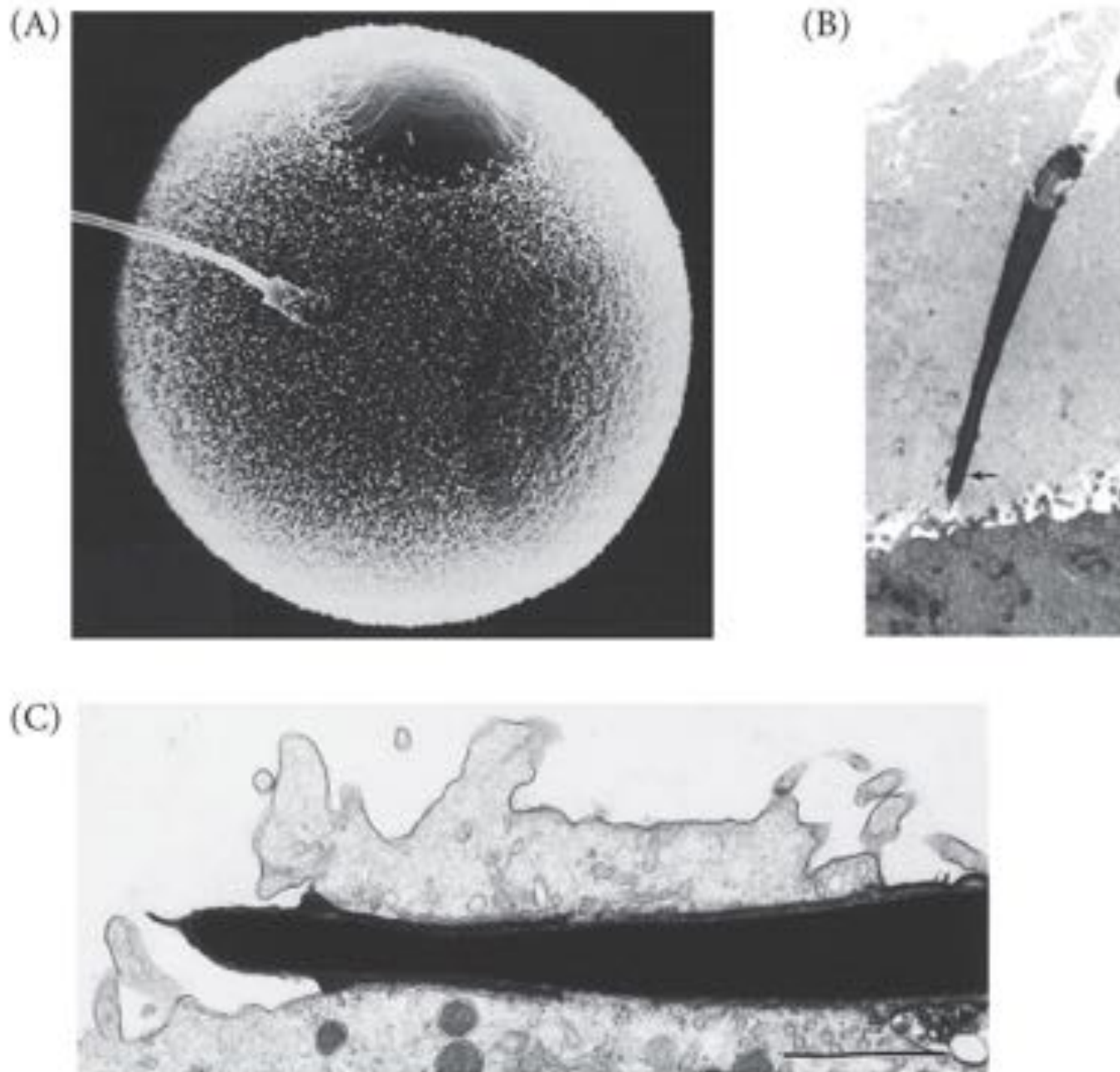
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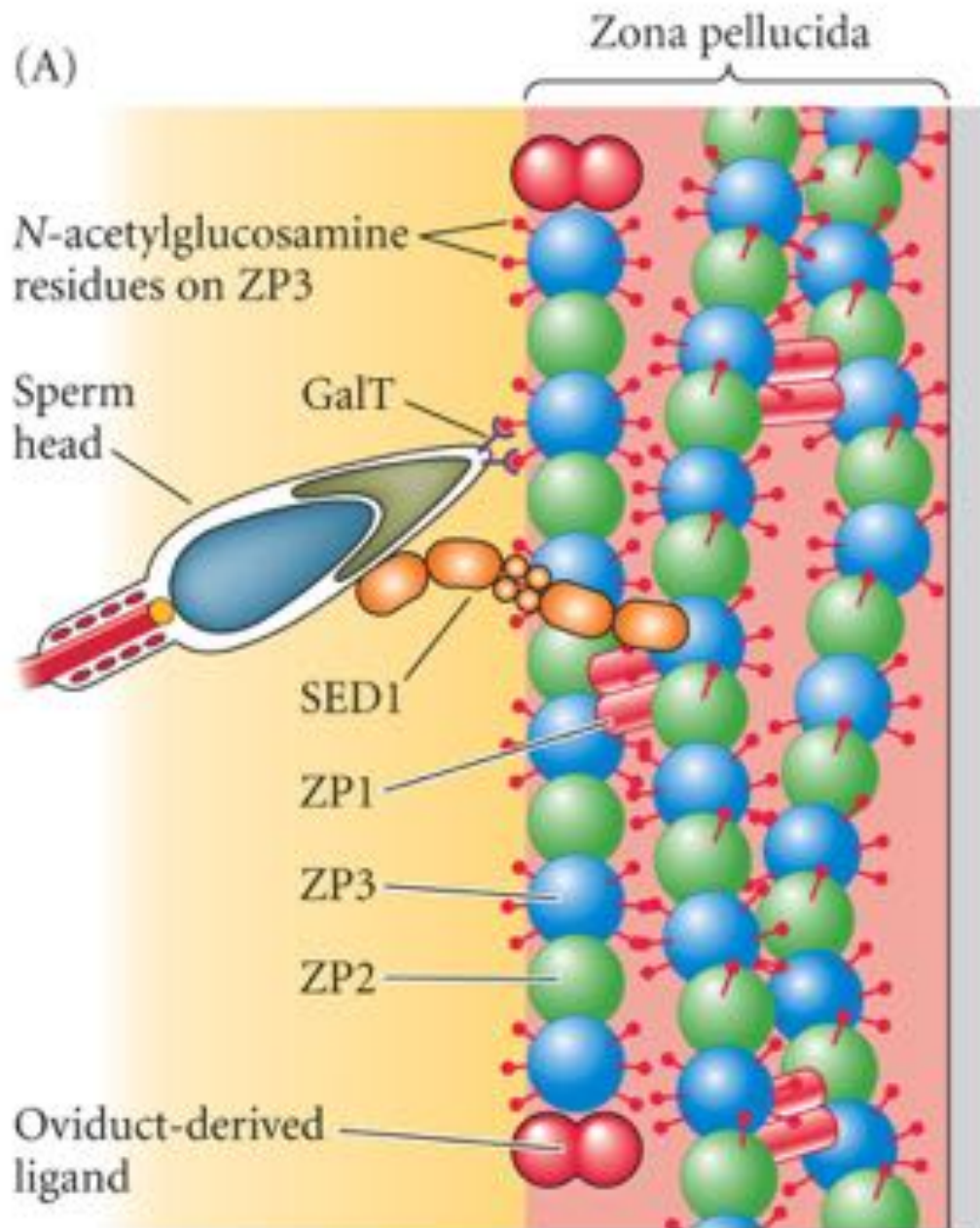
Scanning electron micrographs of the entry of sperm into sea urchin eggs



Entry of sperm into a golden hamster egg



Sperm-zona binding in the mouse



Pense num experimento para comprovar a função e especificidade dos resíduos de açúcar de ZPs no reconhecimento?

Mouse zona protein 3 (ZP3) binds sperm

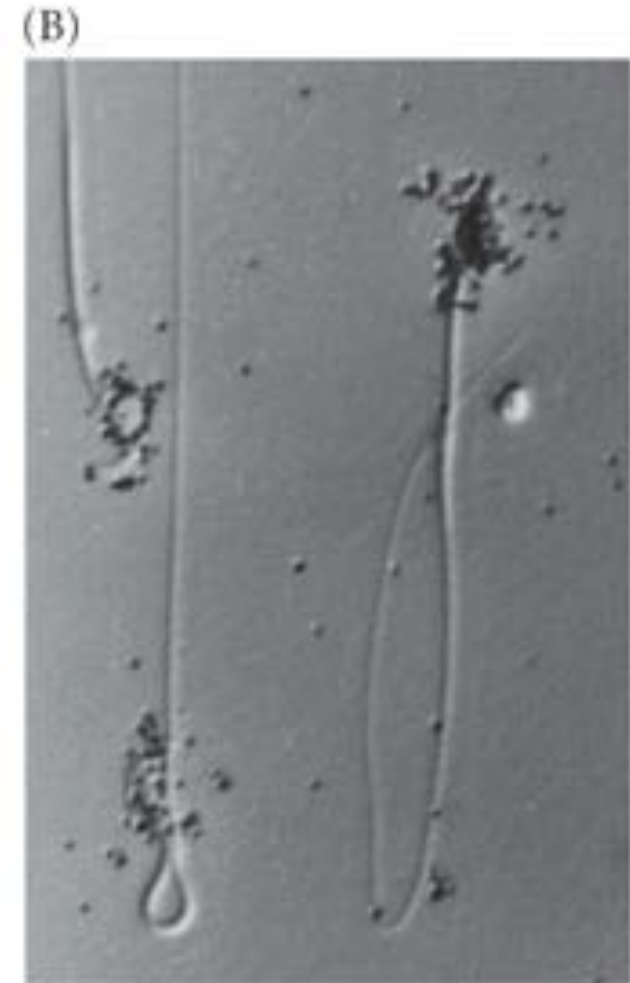
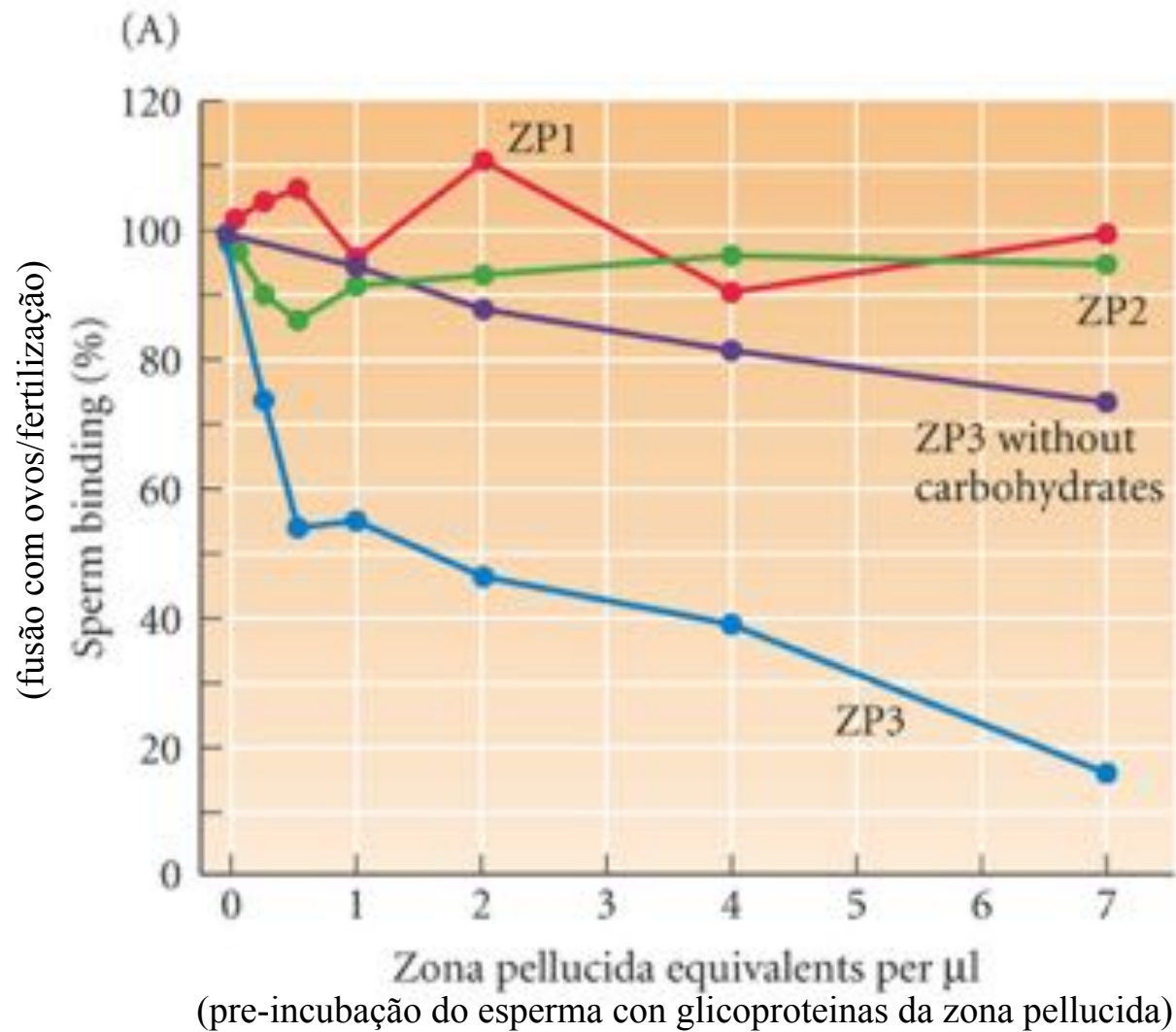


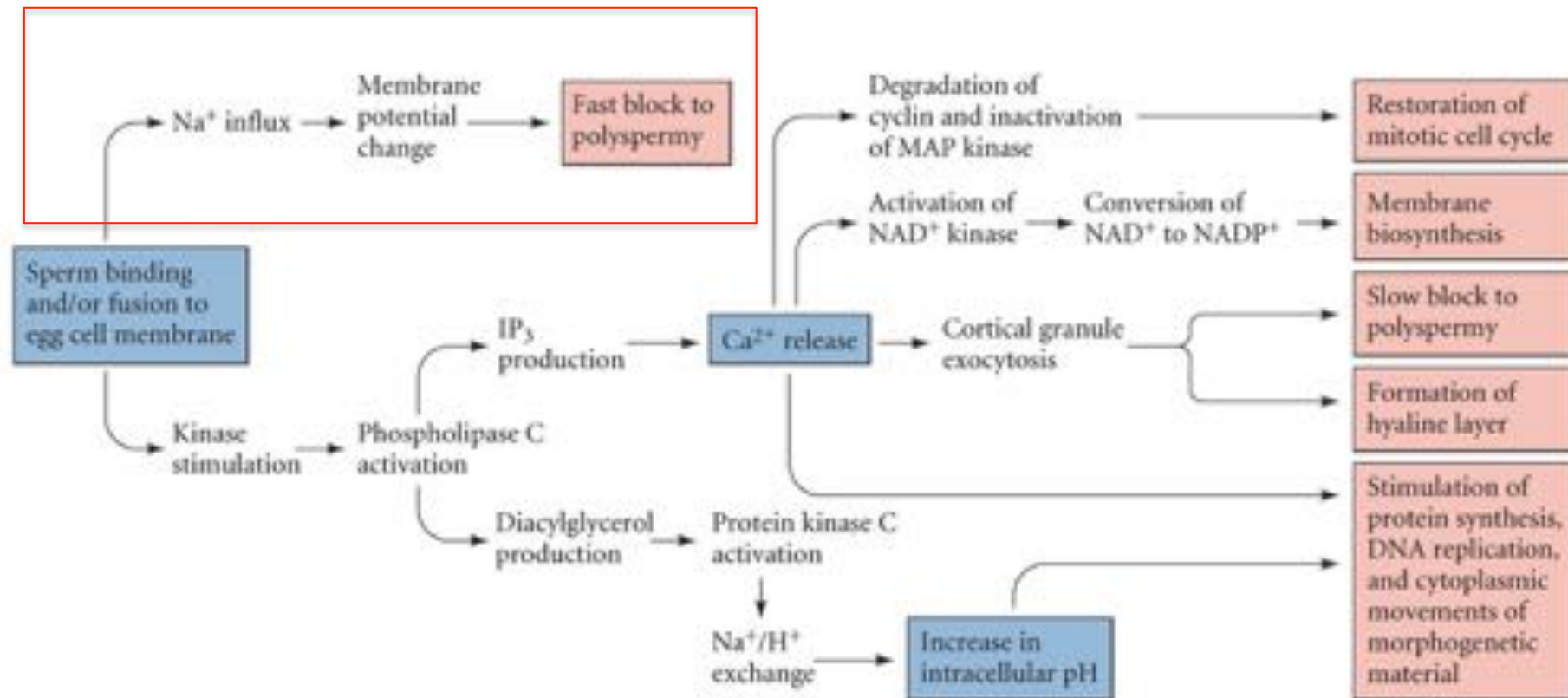
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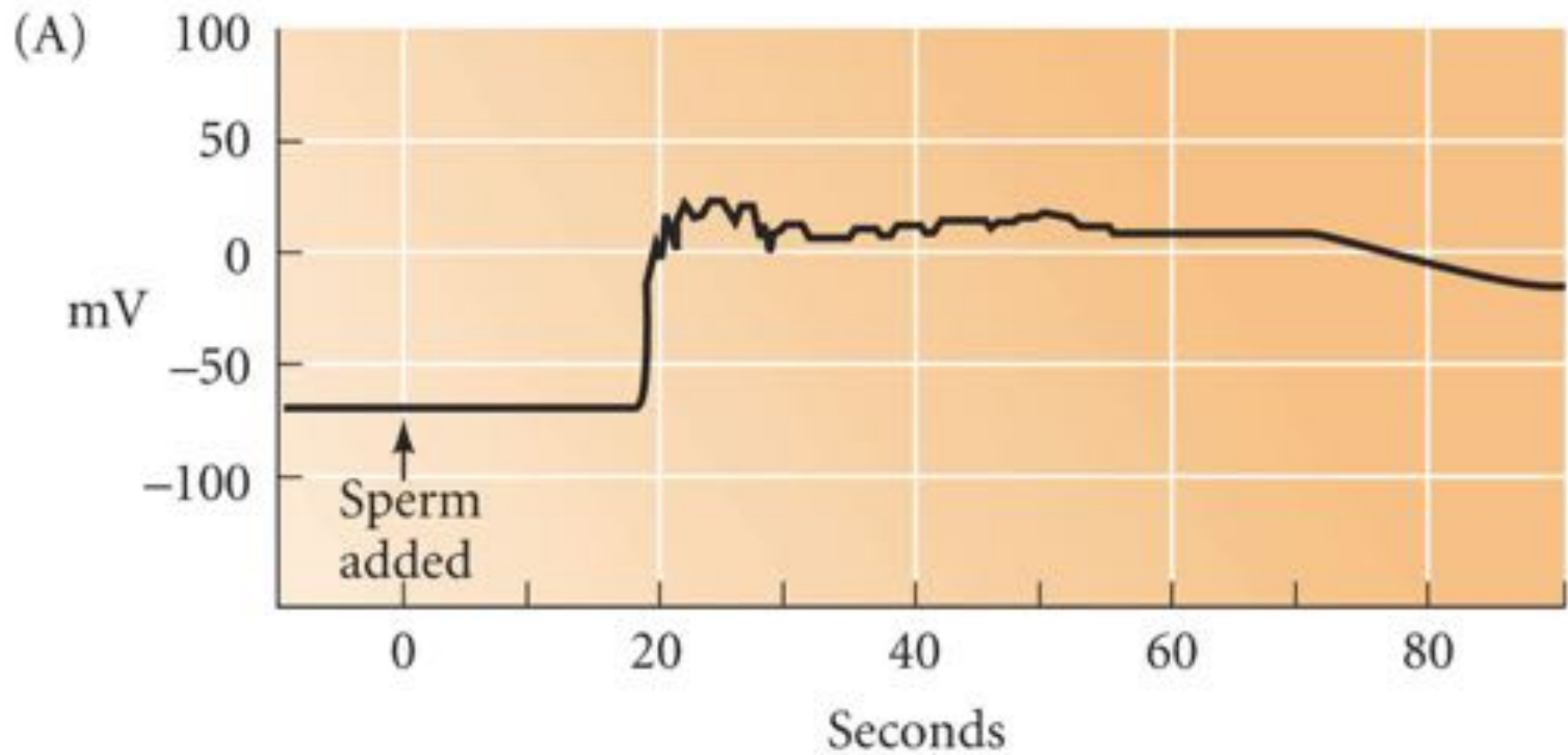
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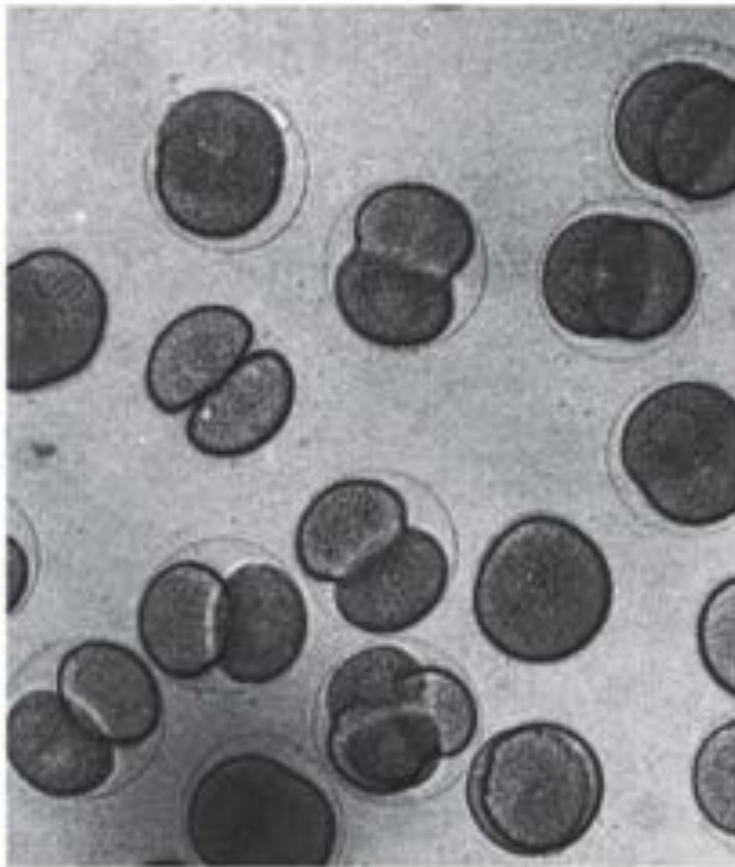
Postulated pathway of egg activation in the sea urchin



Membrane potential of sea urchin eggs before and after fertilization (Part 1)

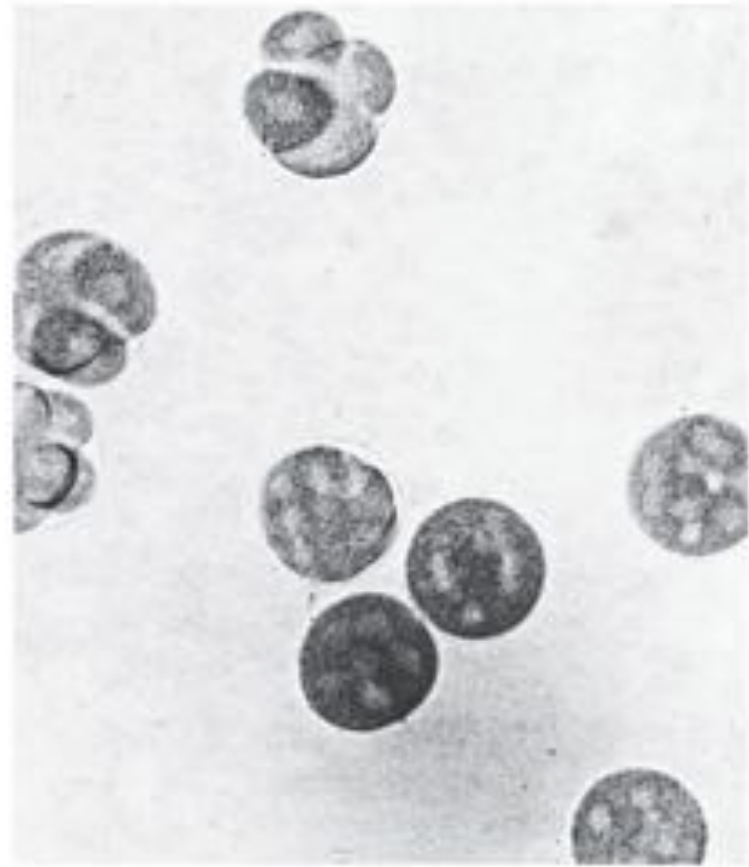


(B)



Control (490 mM Na⁺)

(C)



Medio bajo en sodio (120 mM)

(D)

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

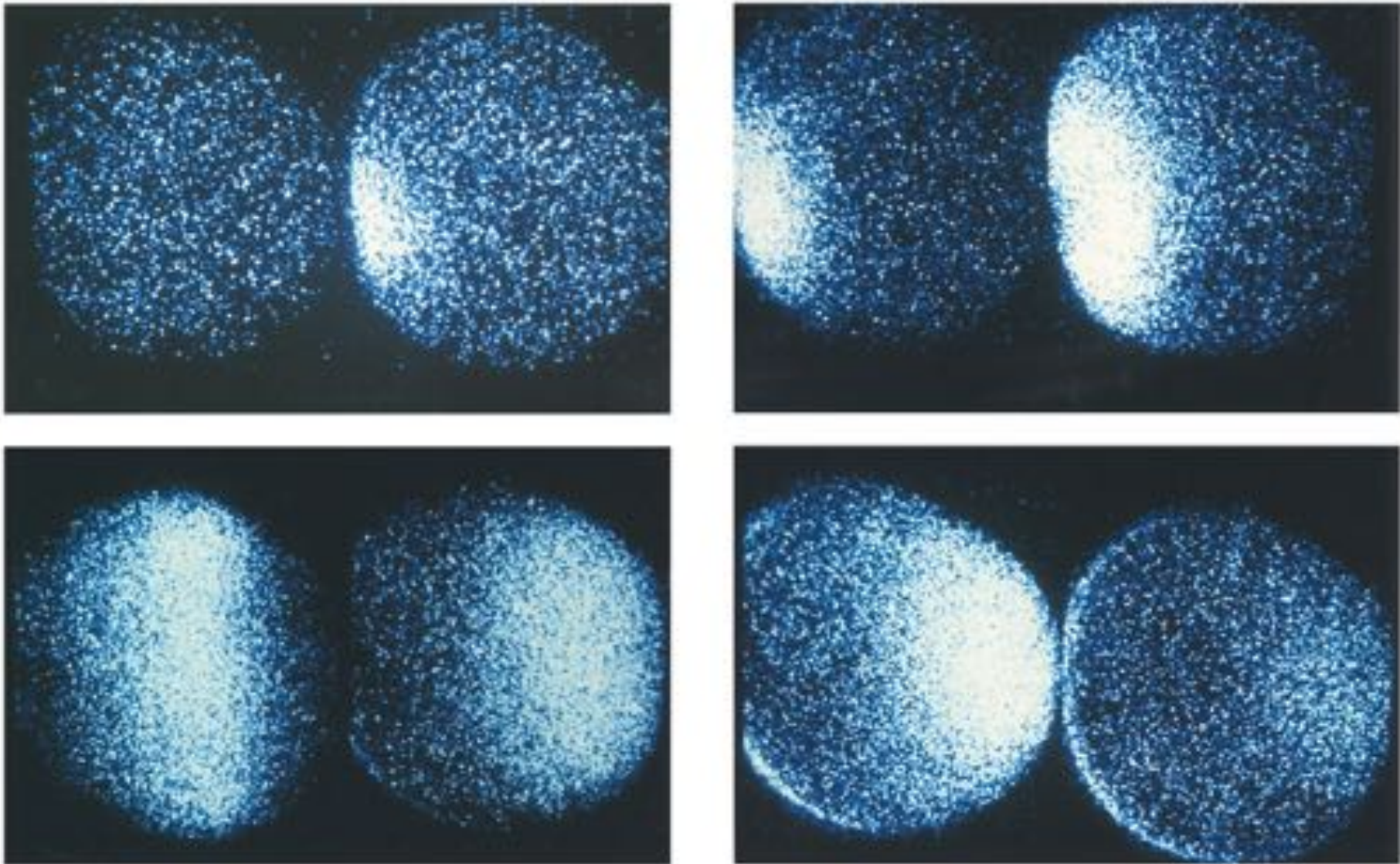
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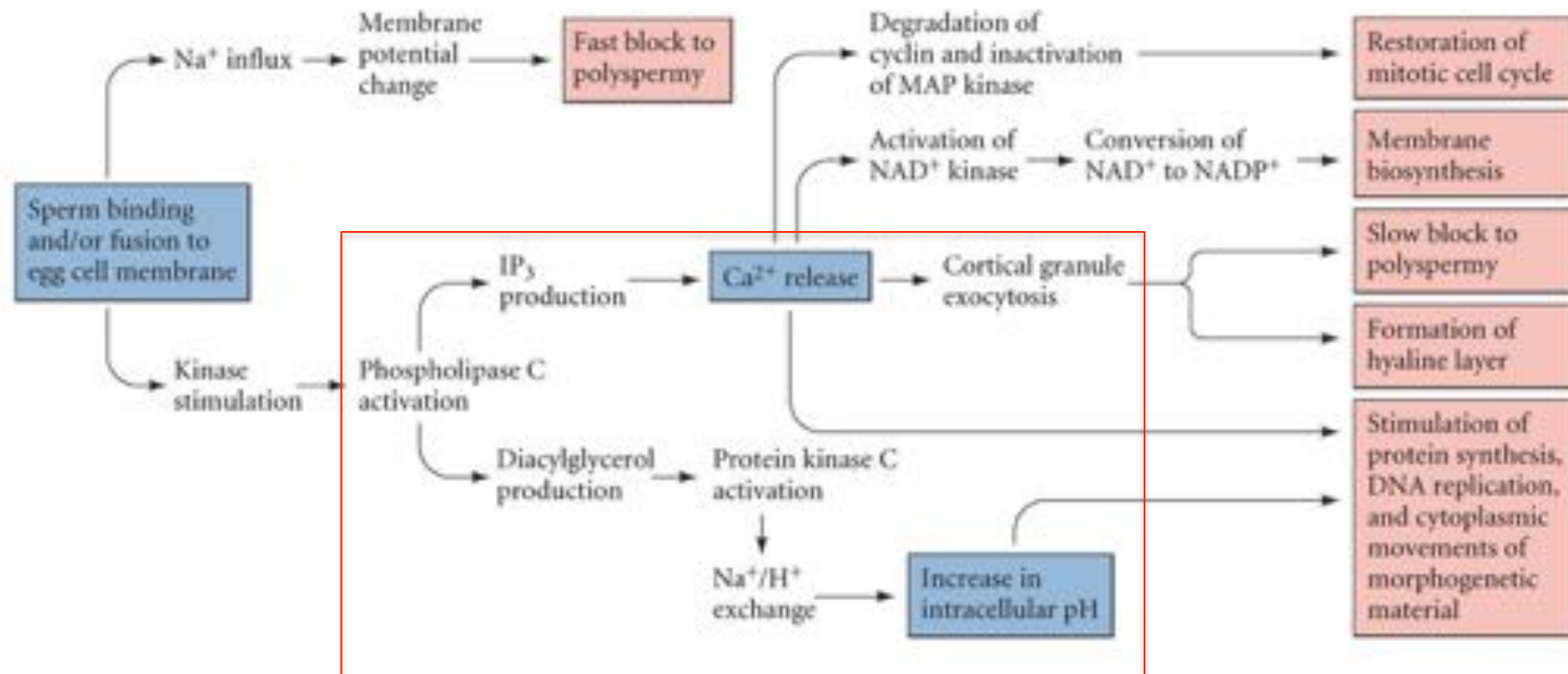
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Wave of Ca^{2+} release across a sea urchin egg during fertilization



Postulated pathway of egg activation in the sea urchin



The roles of inositol phosphates in releasing calcium from the endoplasmic reticulum and the initiation of development

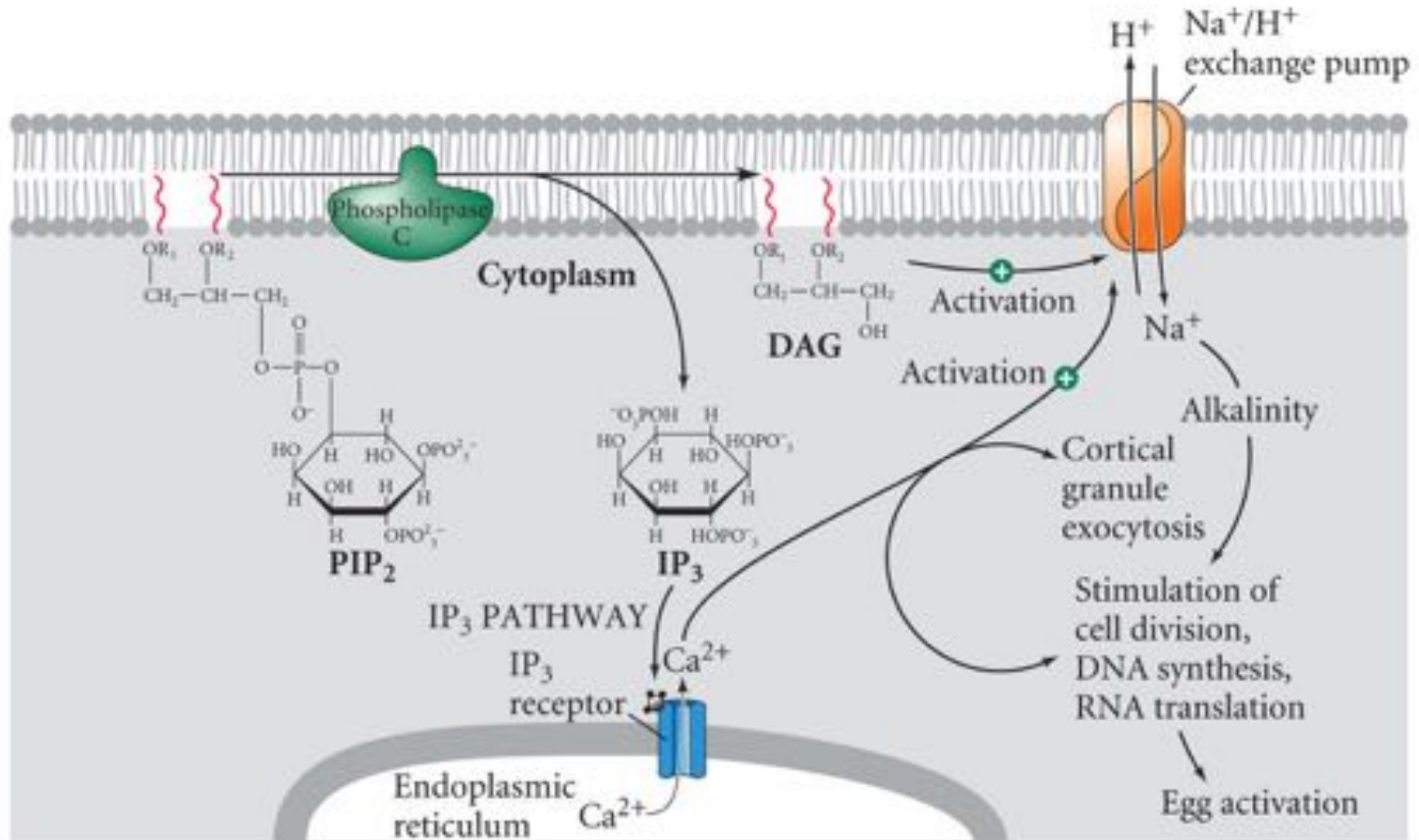


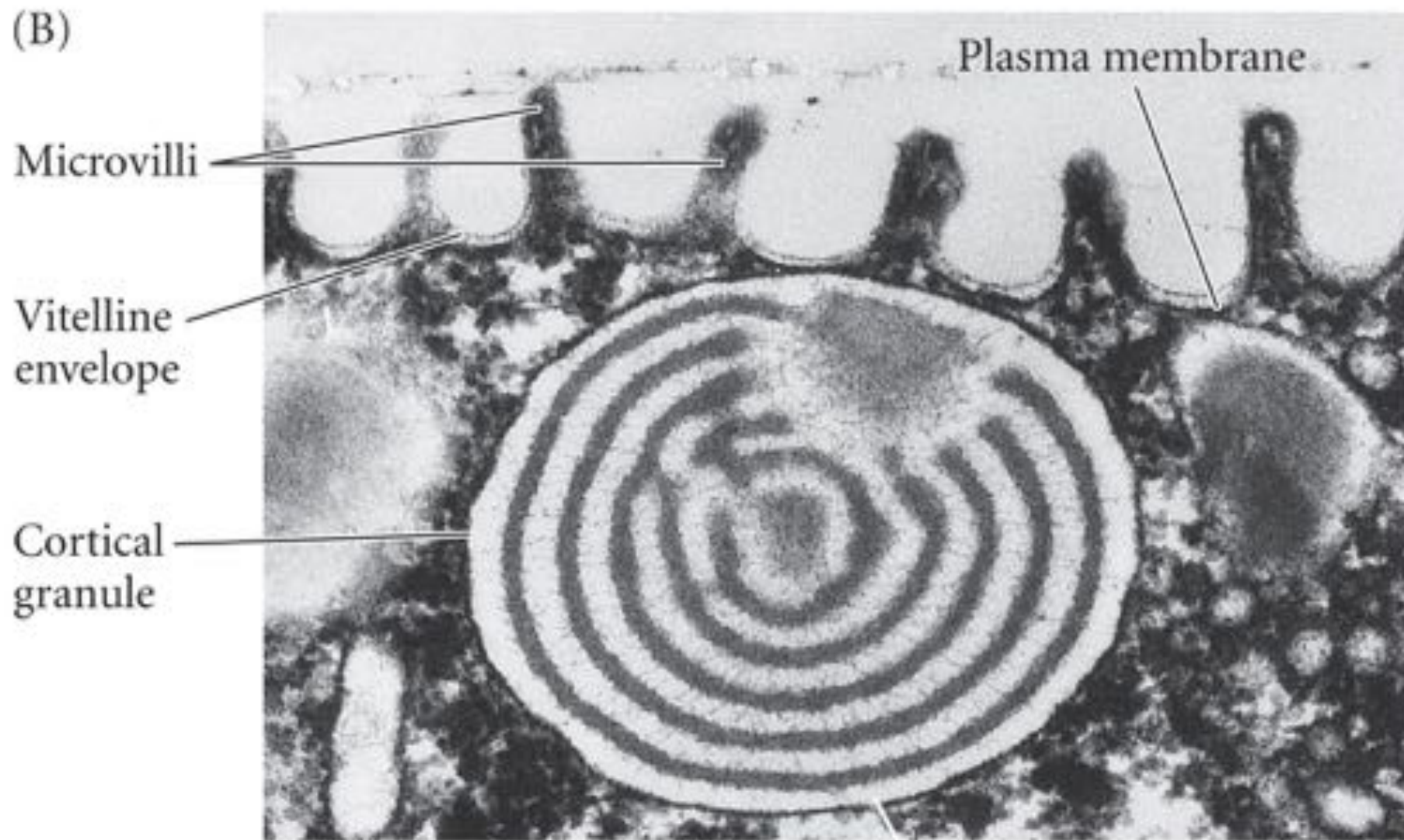
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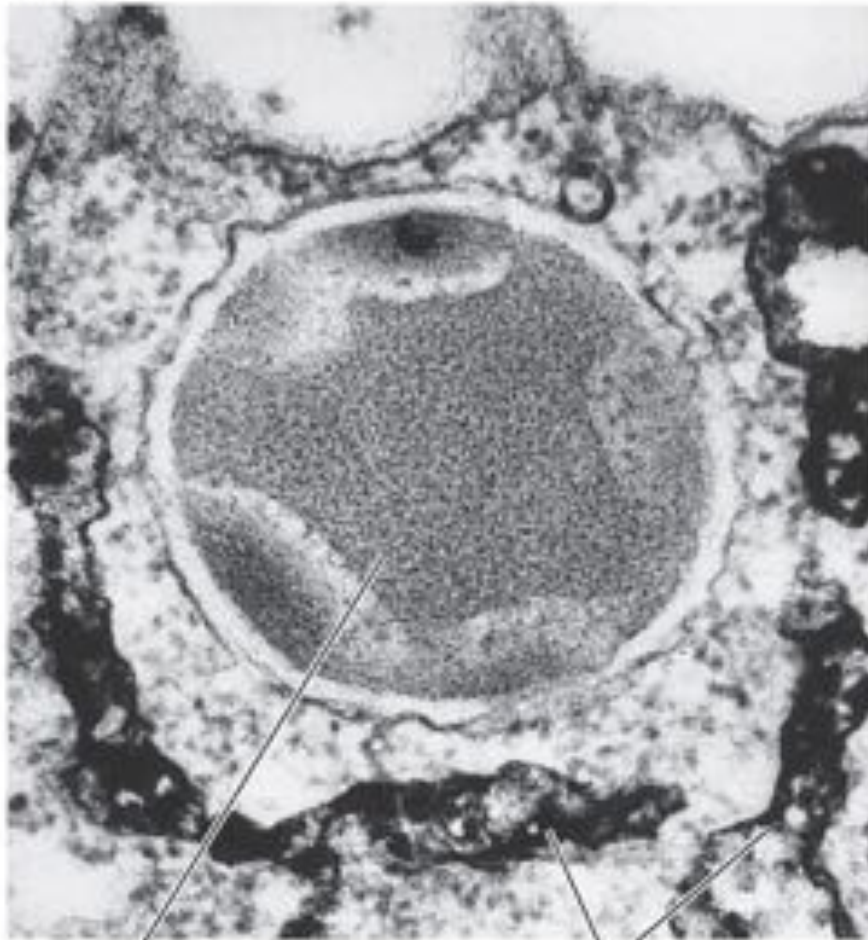
^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

The sea urchin egg cell surface



Endoplasmic reticulum surrounding cortical granules in sea urchin eggs

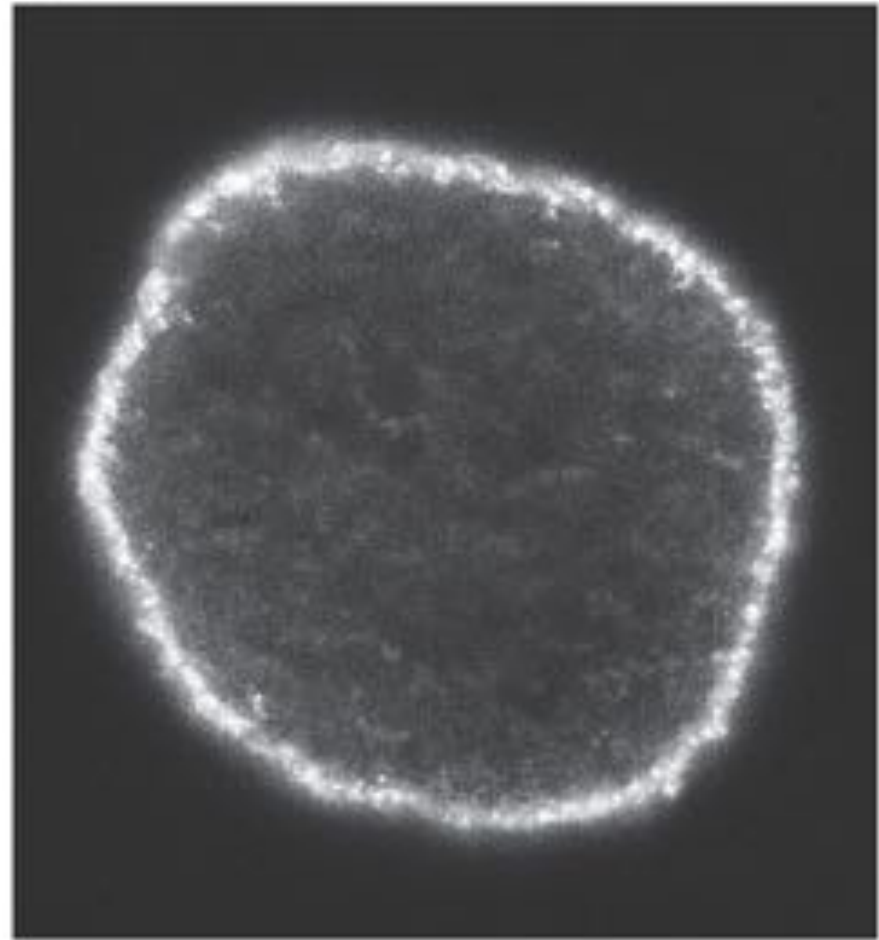
(A)



Cortical granule

Endoplasmic reticulum

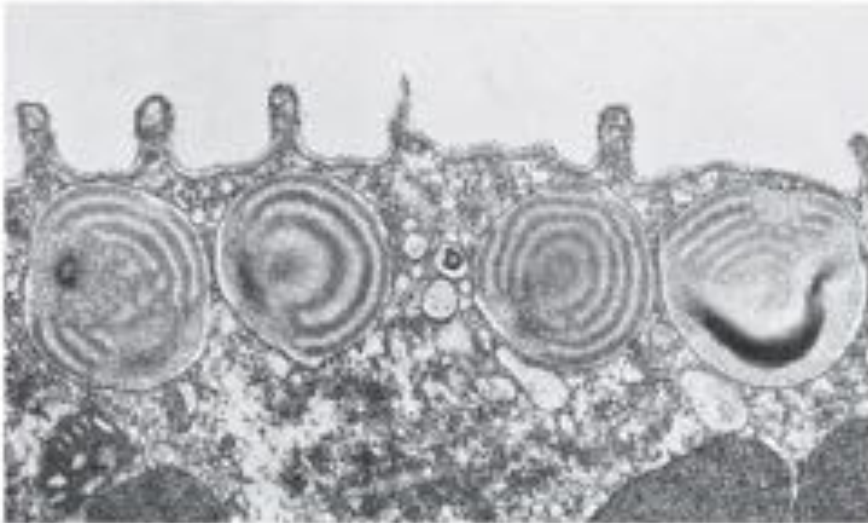
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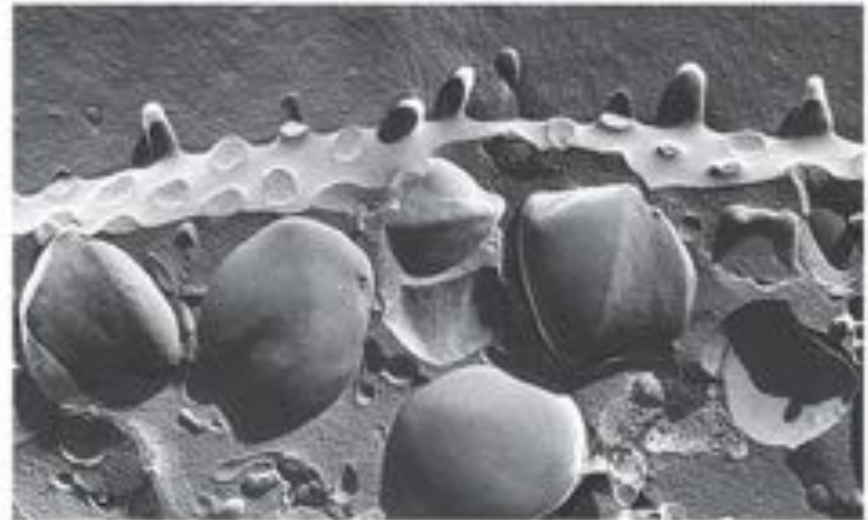
Canales Ca^{2+} dependientes

Cortical granule exocytosis (Part 3)

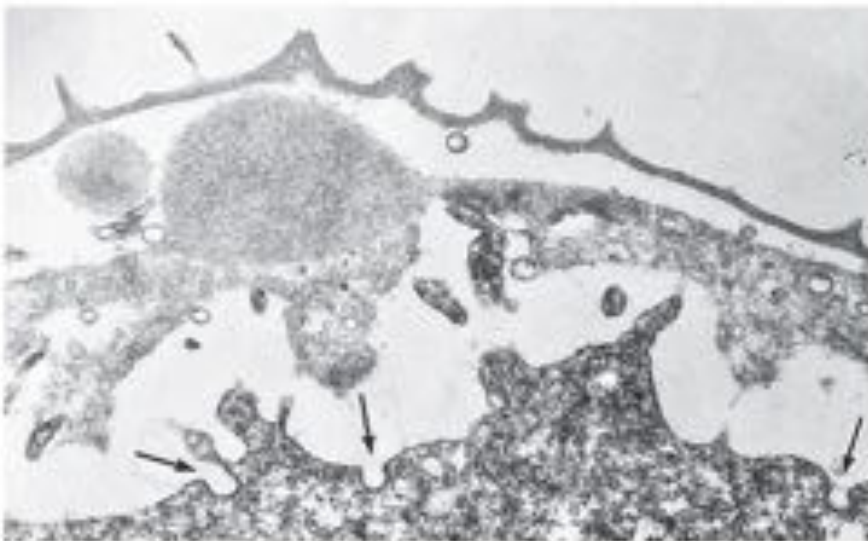
(B)



(C)



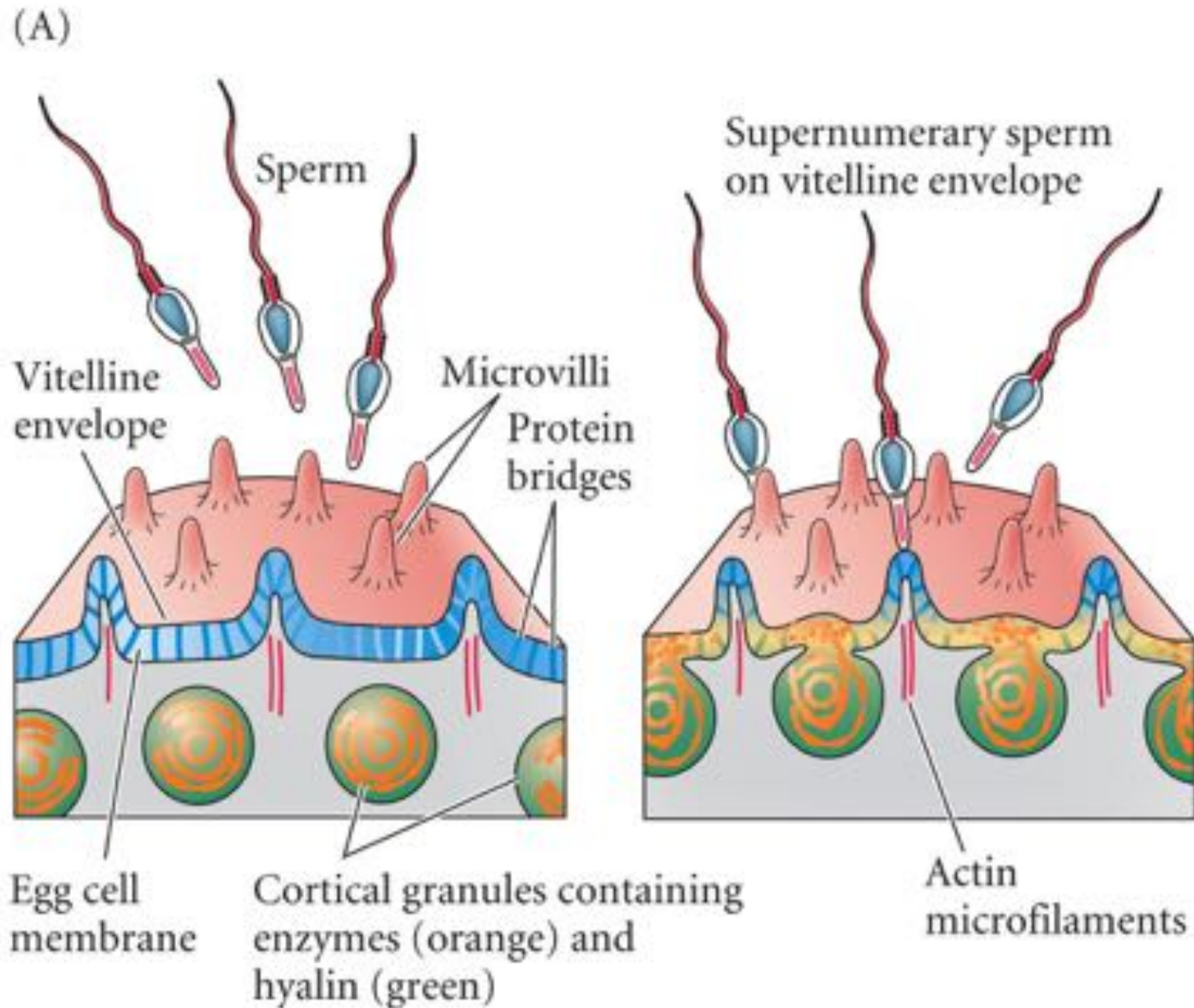
(D)



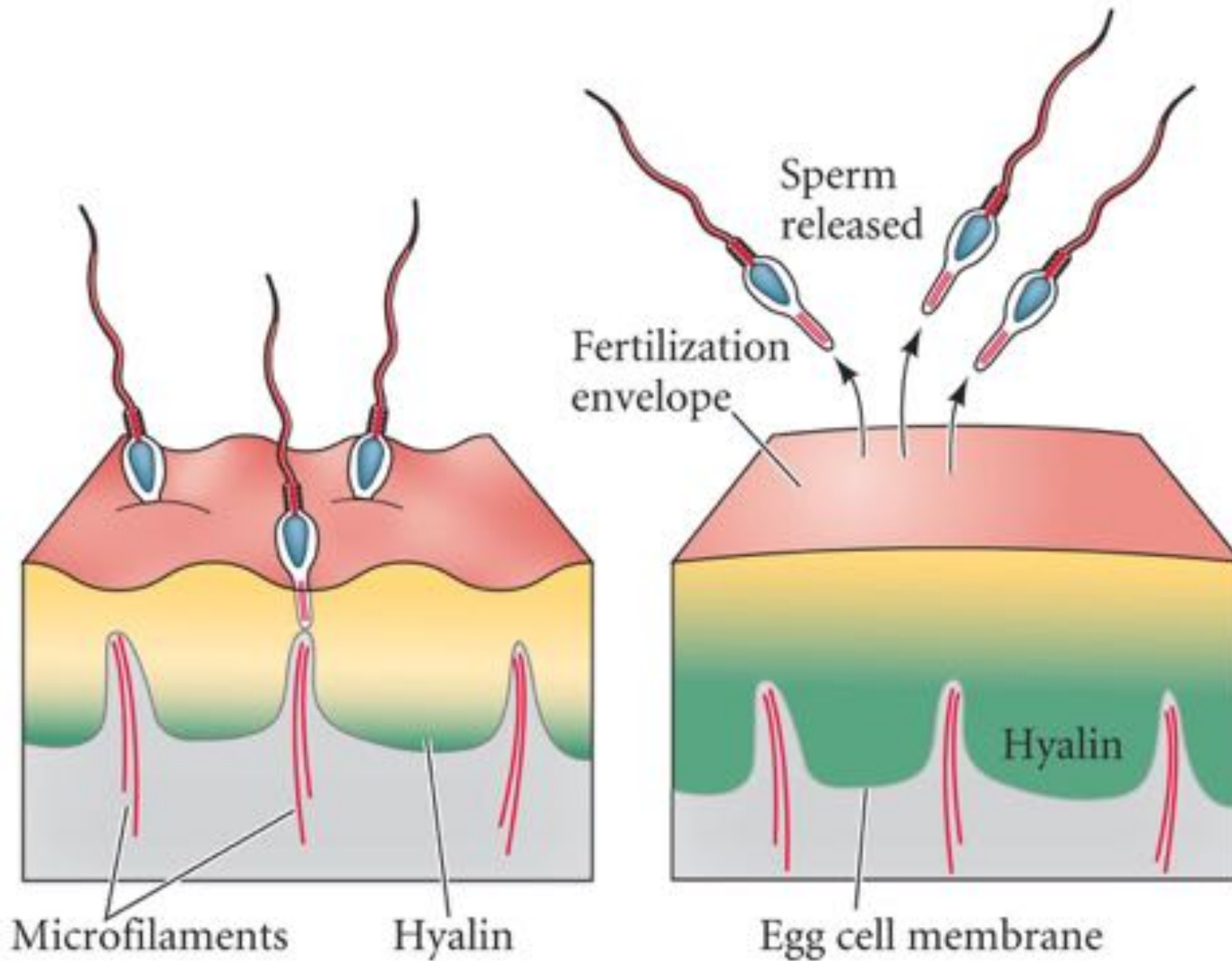
(E)



Cortical granule exocytosis (Part 1)



Cortical granule exocytosis (Part 2)



Formation of the fertilization envelope and removal of excess sperm

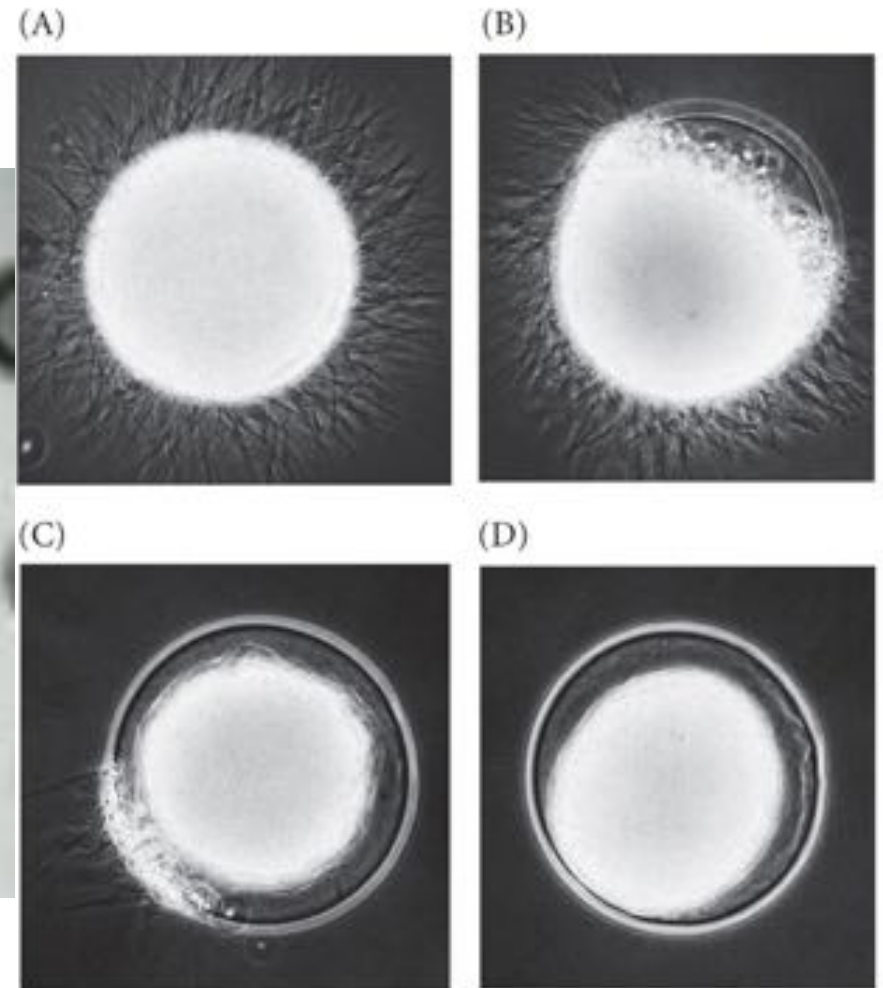
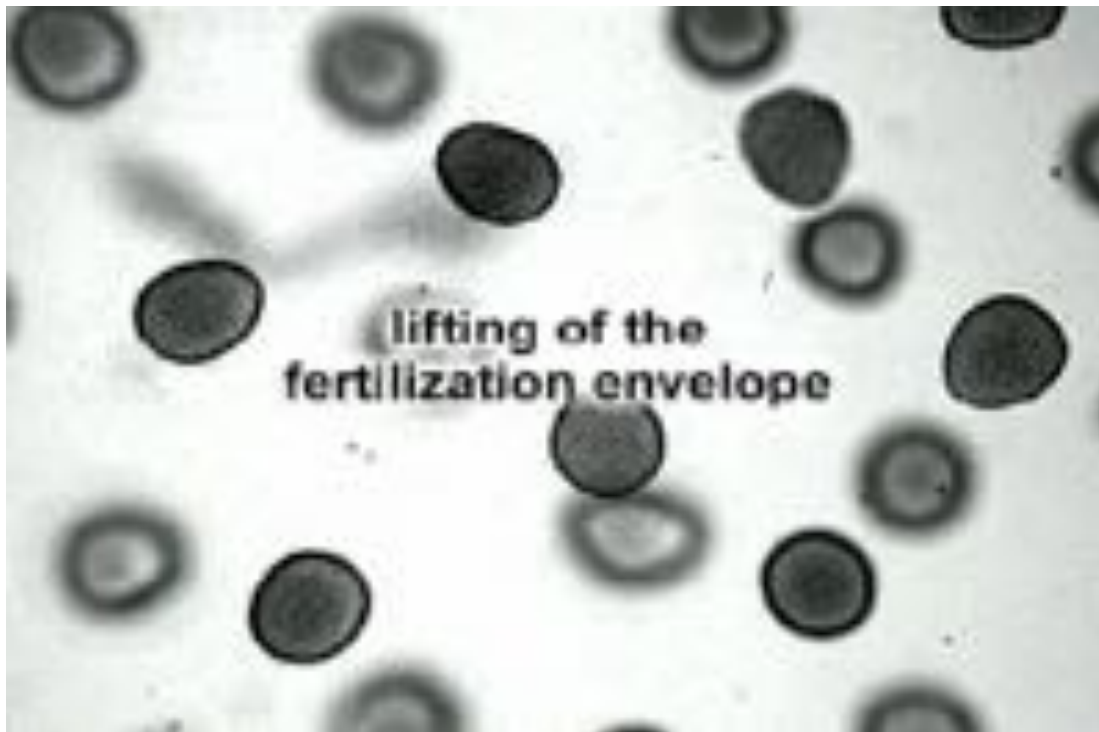


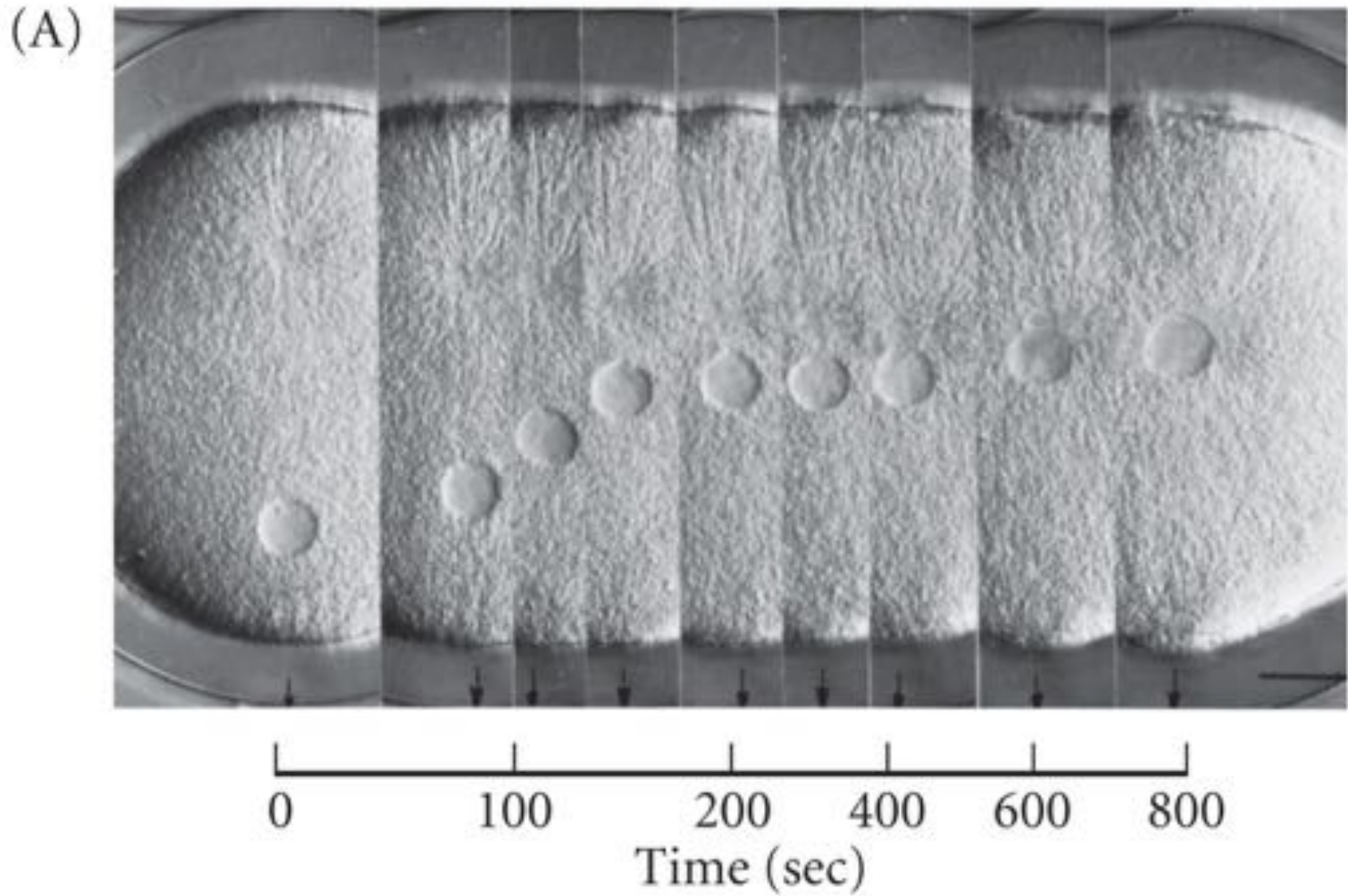
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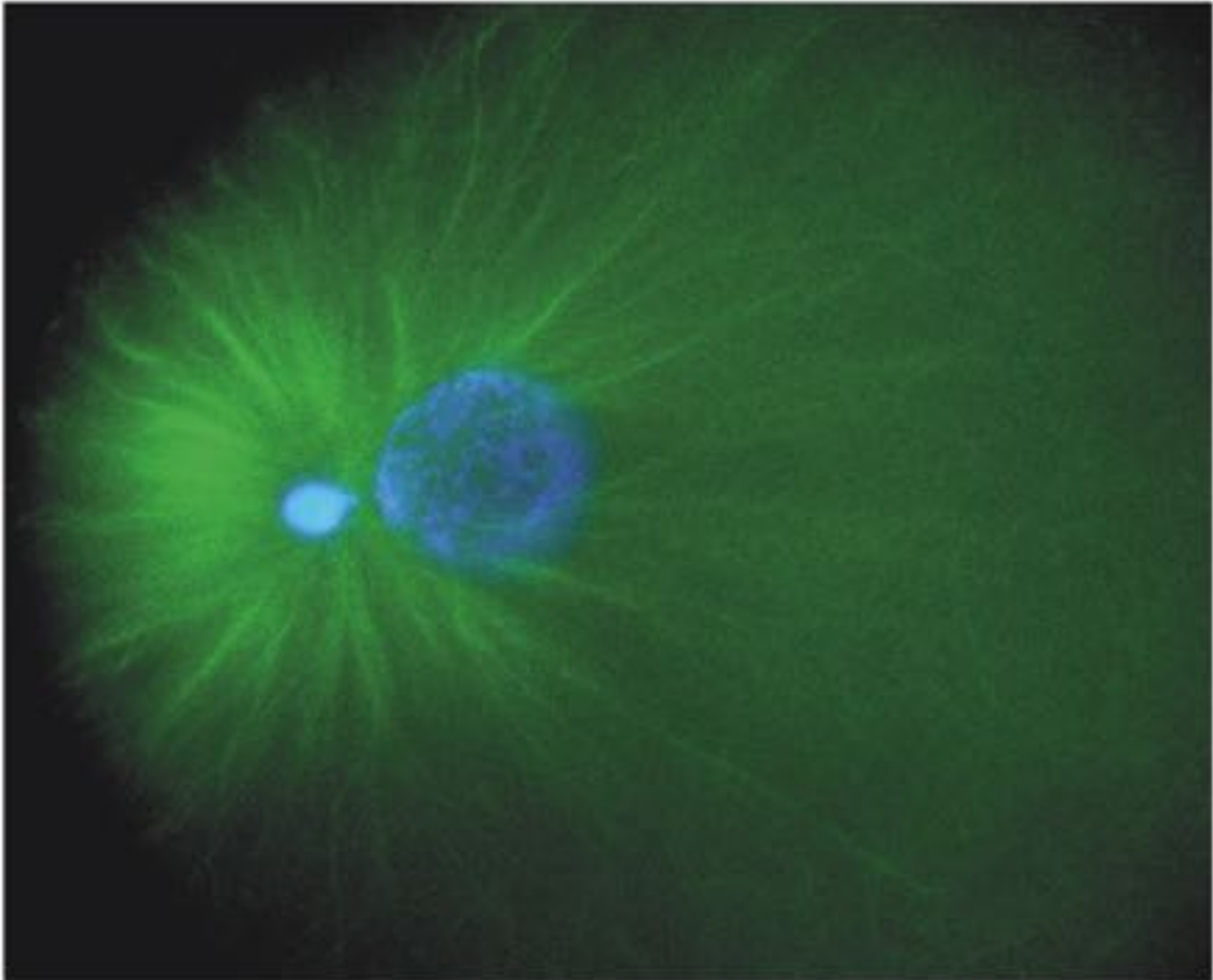
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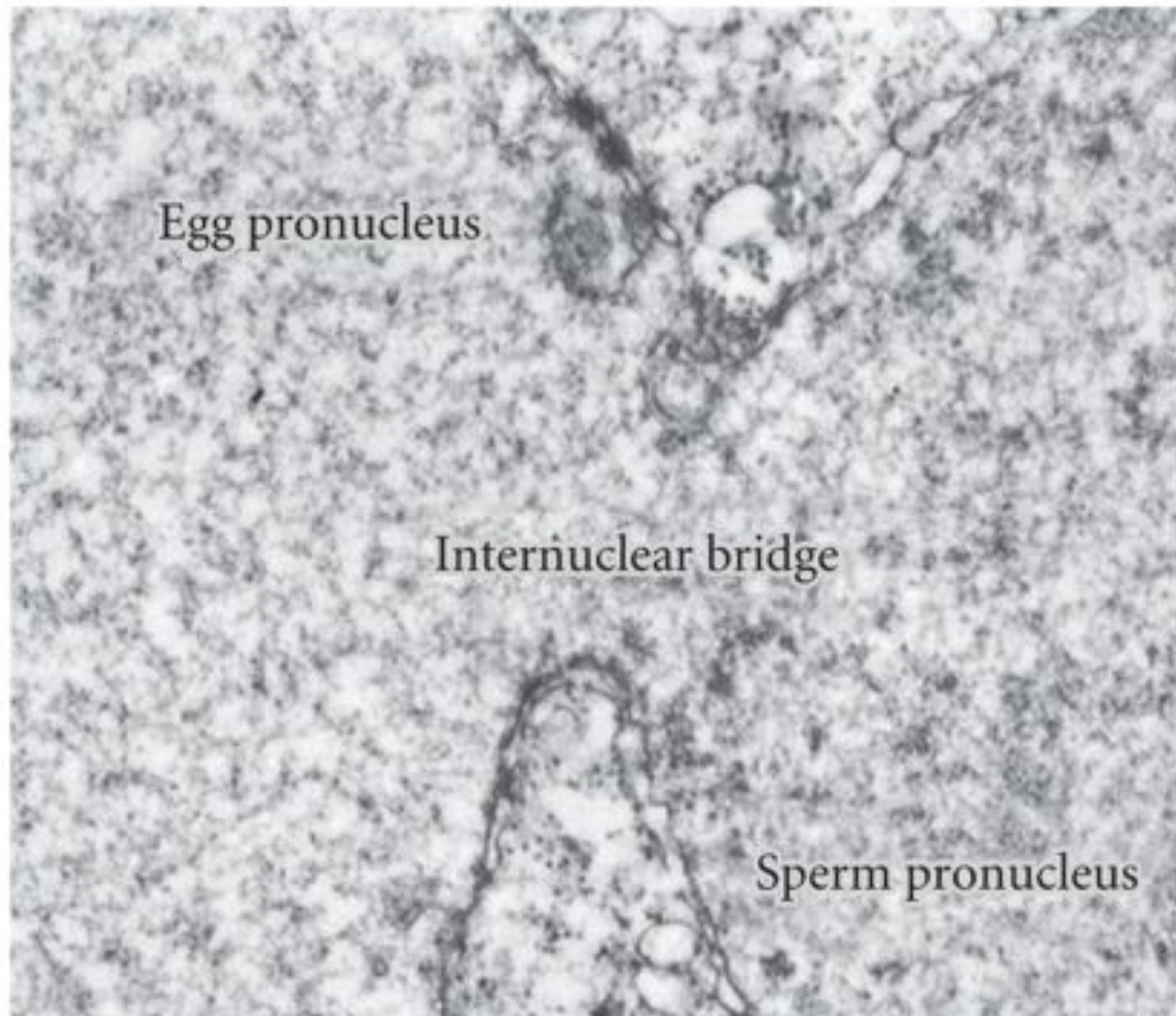
Nuclear events in the fertilization of the sea urchin (Part 1)



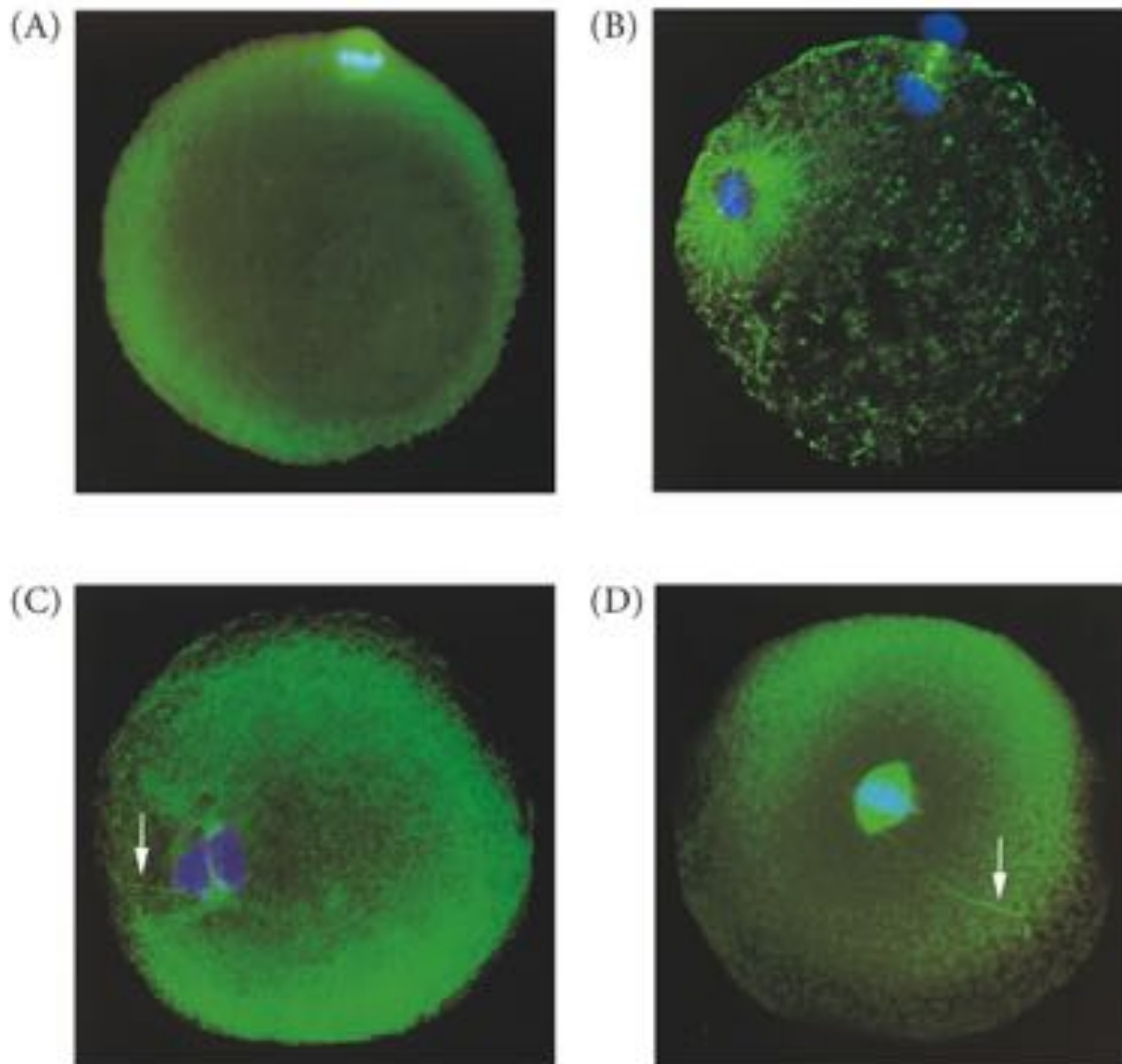
(B)



(C)



Pronuclear movements during human fertilization



Fusión de pronúcleos

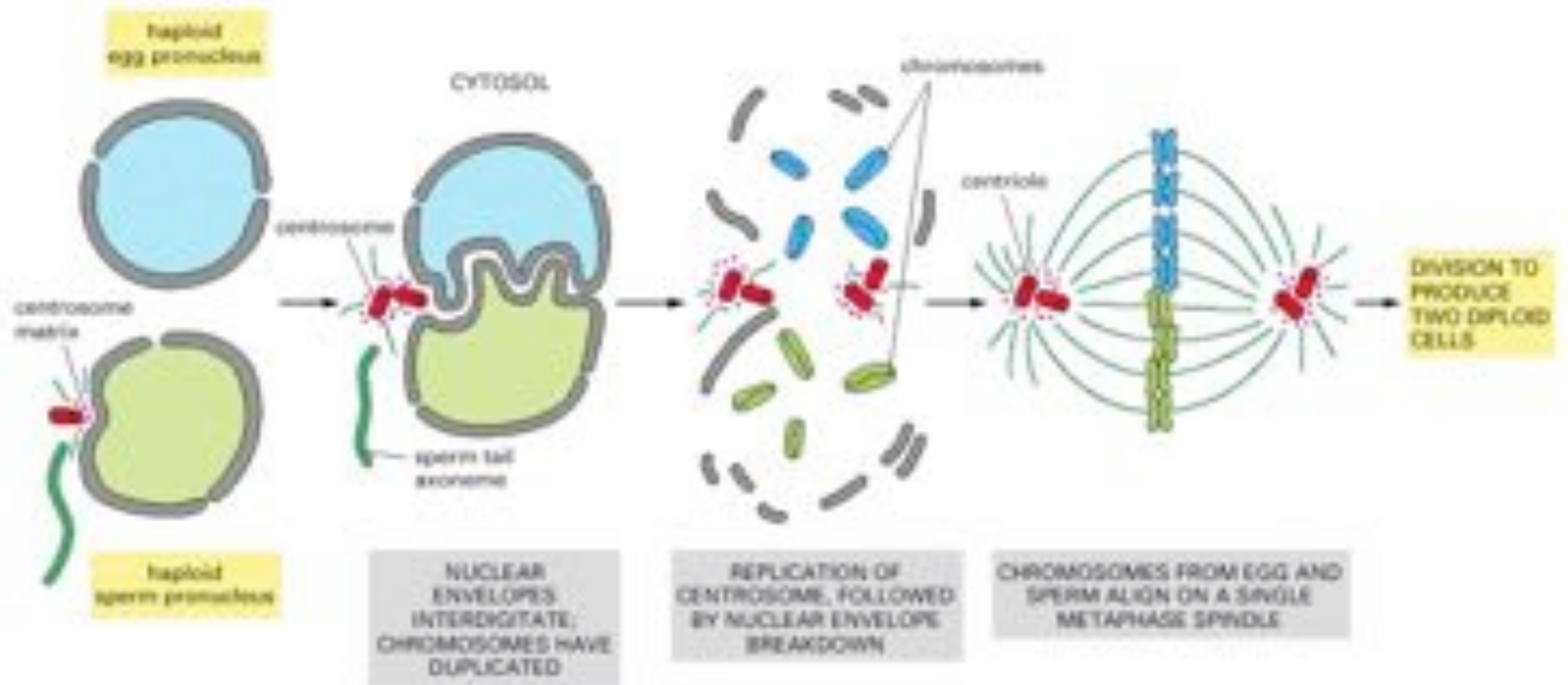


TABLE 7.1 Events of sea urchin fertilization

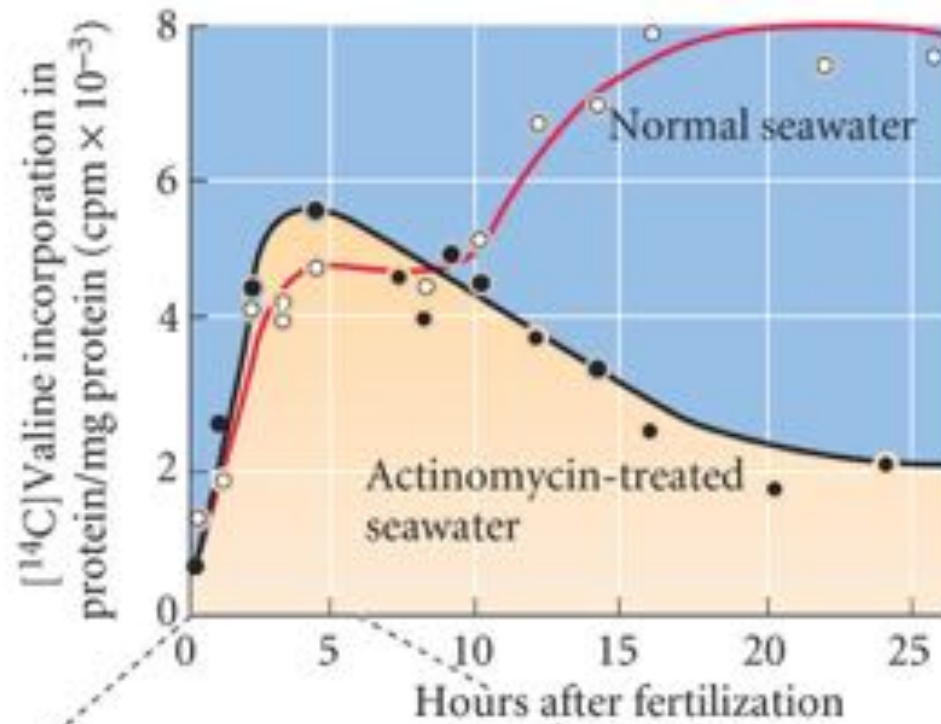
Event	Approximate time postinsemination ^a
EARLY RESPONSES	
Sperm-egg binding	0 seconds
Fertilization potential rise (fast block to polyspermy)	within 1 sec
Sperm-egg membrane fusion	within 1 sec
Calcium increase first detected	10 sec
Cortical granule exocytosis (slow block to polyspermy)	15–60 sec
LATE 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.

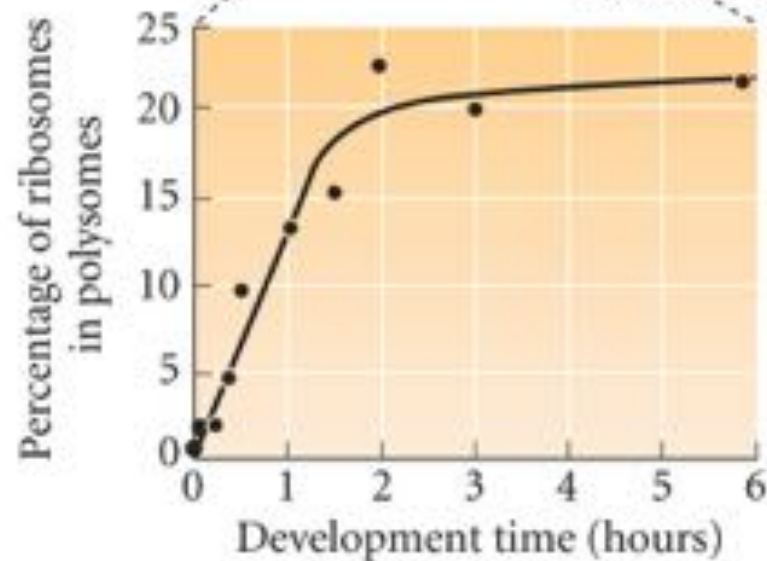
^aApproximate times based on data from *S. purpuratus* (15–17°C), *L. pictus* (16–18°C), *A. punctulata* (18–20°C), and *L. variegatus* (22–24°C). The timing of events within the first minute is best known for *Lytechinus variegatus*, so times are listed for that species.

A burst of protein synthesis at fertilization uses mRNAs stored in the oocyte cytoplasm

(A)



(B)



Polisomas:

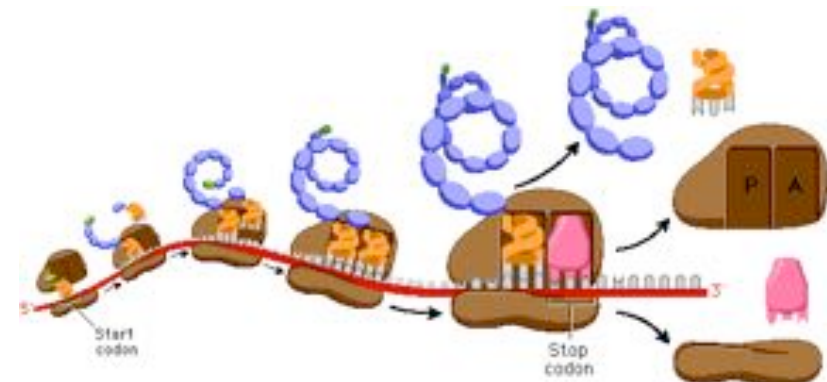


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