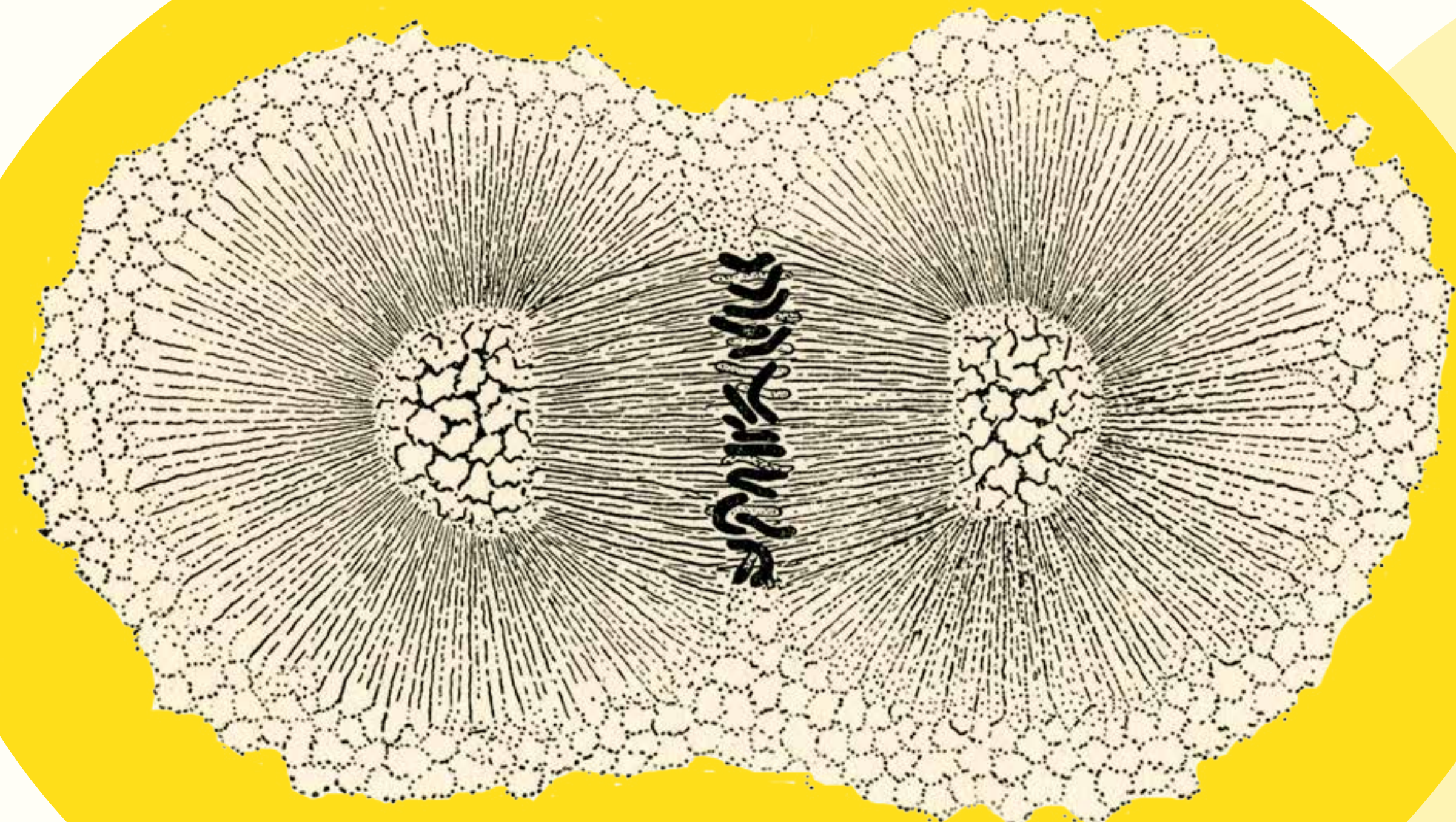


# FROM FERTILIZATION TO ORGANISMS

From the MBL's beginning in 1888, director Charles Otis Whitman inspired cell lineage studies. MBL researchers studied how a single fertilized egg becomes a multicellular embryo and on to an organized complex organism.



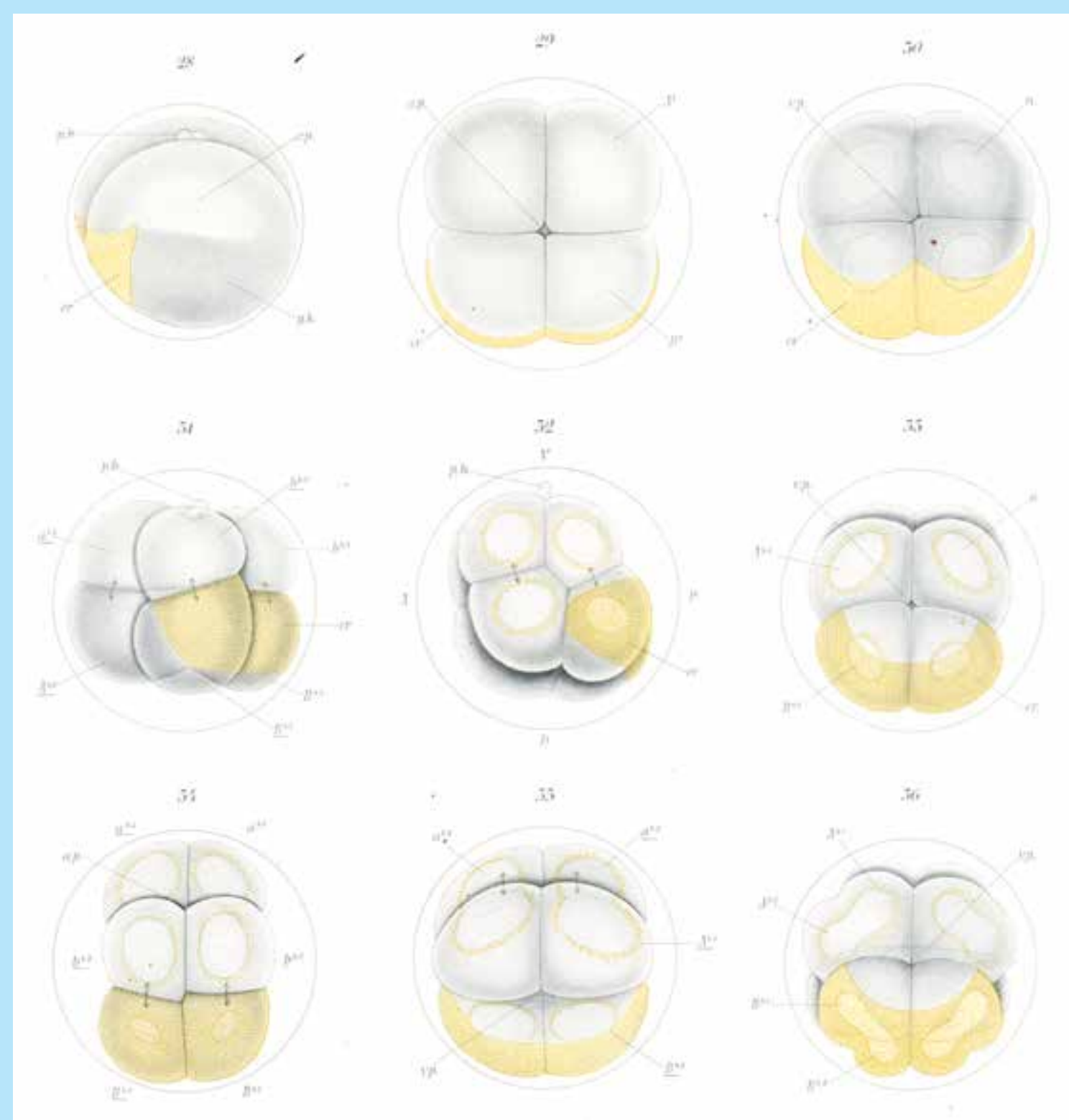
*Nereis* egg division  
Wilson 1895



*Nereis* egg division  
Wilson 1895

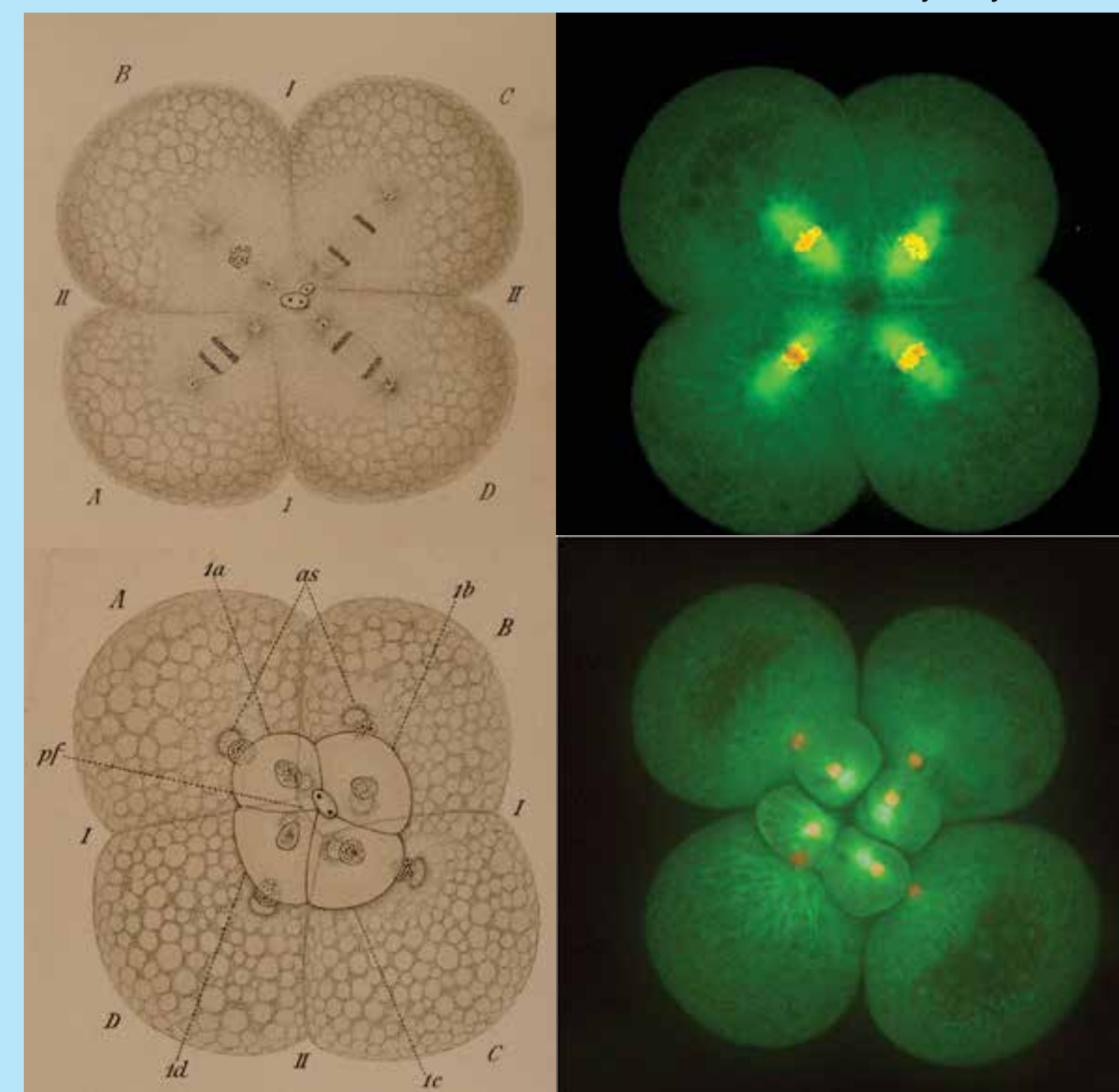
Using different marine organisms, they followed the lineage through every cell division, watching fertilized egg cells divide into 2, 4, 8 cells, and so on. Fixing, staining, observing, drawing, and photographing allowed each researcher to share and compare with others. The images began to reveal the patterns of development.

Ascidian egg division Conklin 1905



Conklin 1897

Henry & Lyons 2014



Successive cleavage stages in slipper snail embryos, from 4 cells (top) to 8 (bottom)

Photomicrographs with fluorescently labeled organelles (right)

Comparing embryos from different species showed that cells can divide faster or slower, into larger or smaller cells, sometimes through spiral cleavage, and always in ways that cause differentiation among cells that allows them to form organisms.

As they watched the cells divide into many hundreds and even thousands more cells and differentiate, they began to see new cell parts: a nucleus with chromosomes, spindle fibers to help direct the dance of cell division, organelles, and other details.

All this detail led to a larger question: what is common across these cells?  
What is "the cell?"