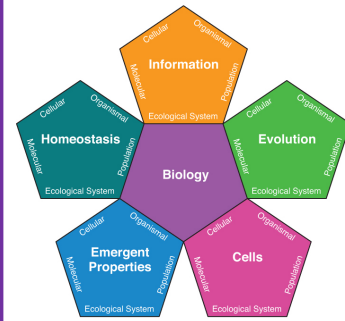


Integrating Concepts in Biology



PowerPoint Slides for Chapter 3: **Reproduction and Cell Division**

3.5 How can two parents produce non-identical offspring?

by A. Malcolm Campbell, Laurie J. Heyer, &
Christopher Paradise

Biology Learning Objectives

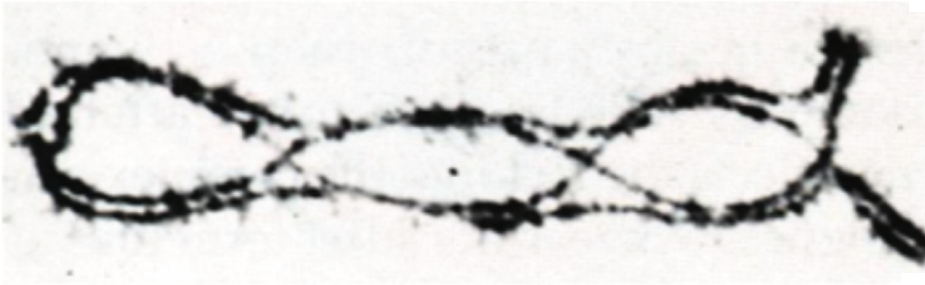
- Describe the process of meiosis and its genetic outcomes.
- Compare and contrast meiosis and mitosis.

ELSI Learning Objective

- Evaluate the pros and cons associated with genetically engineering human babies.

Chromatid Recombination

four chromatids during crossing over



A

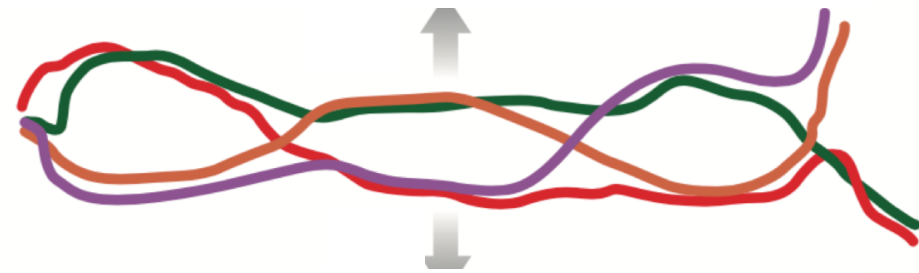
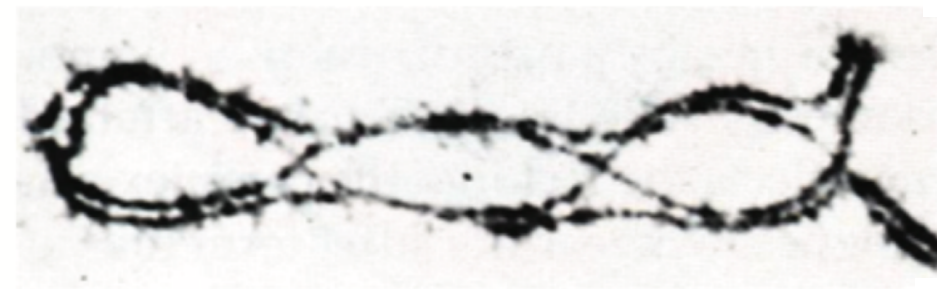
Fig. 3.23

A: from Jones and Franklin, 2006

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Chromatid Recombination

diagram of these four chromatids

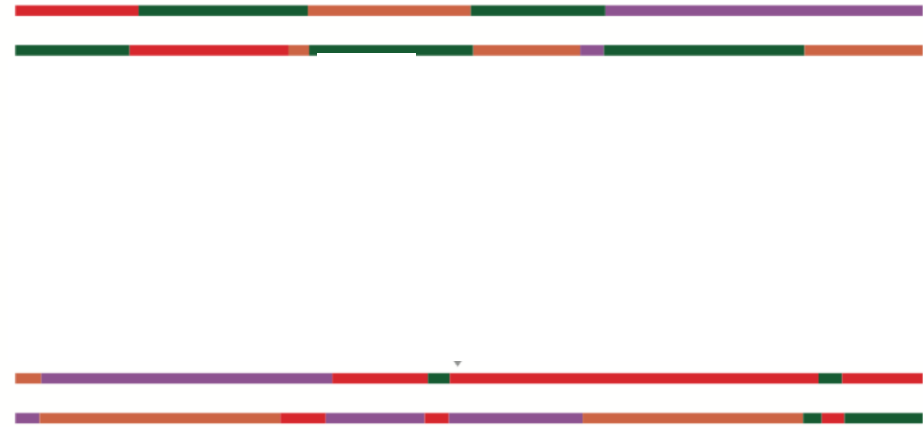
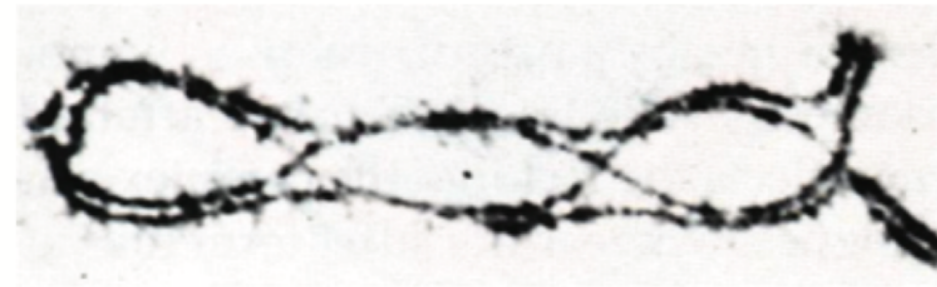


A

B

Fig. 3.23

Chromatid Recombination



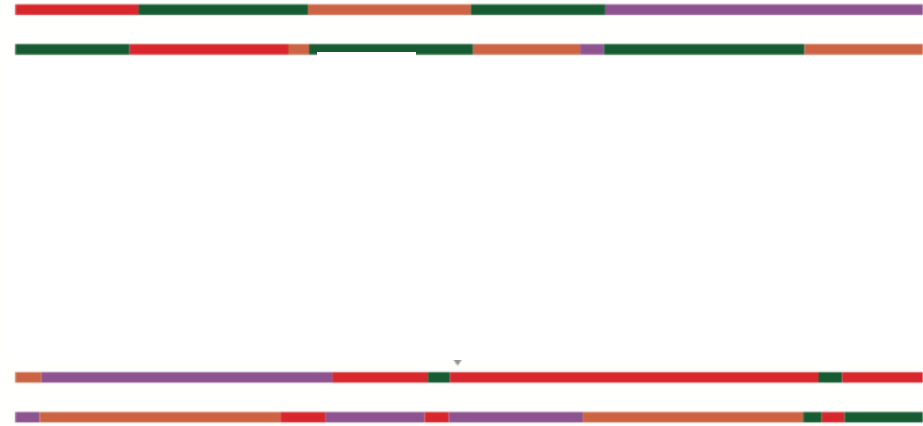
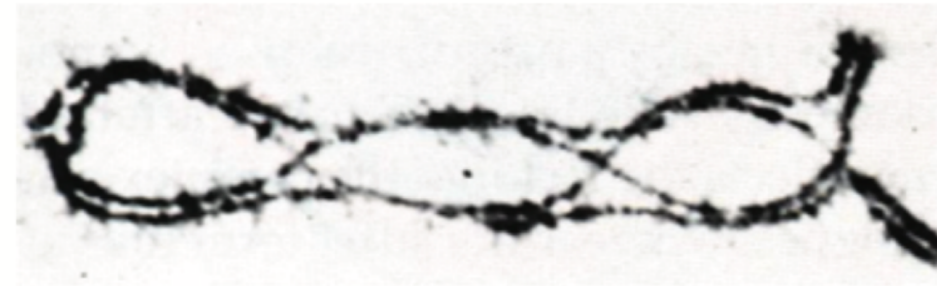
B

same four chromatids
pulled apart to show
their mosaic composition

A

Fig. 3.23

Chromatid Recombination



A

B

all 4 post-prophase I chromatids have content from each of the other pre-prophase I chromatids

Fig. 3.23

A: from Jones and Franklin, 2006

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Preparing for Sexual Reproduction

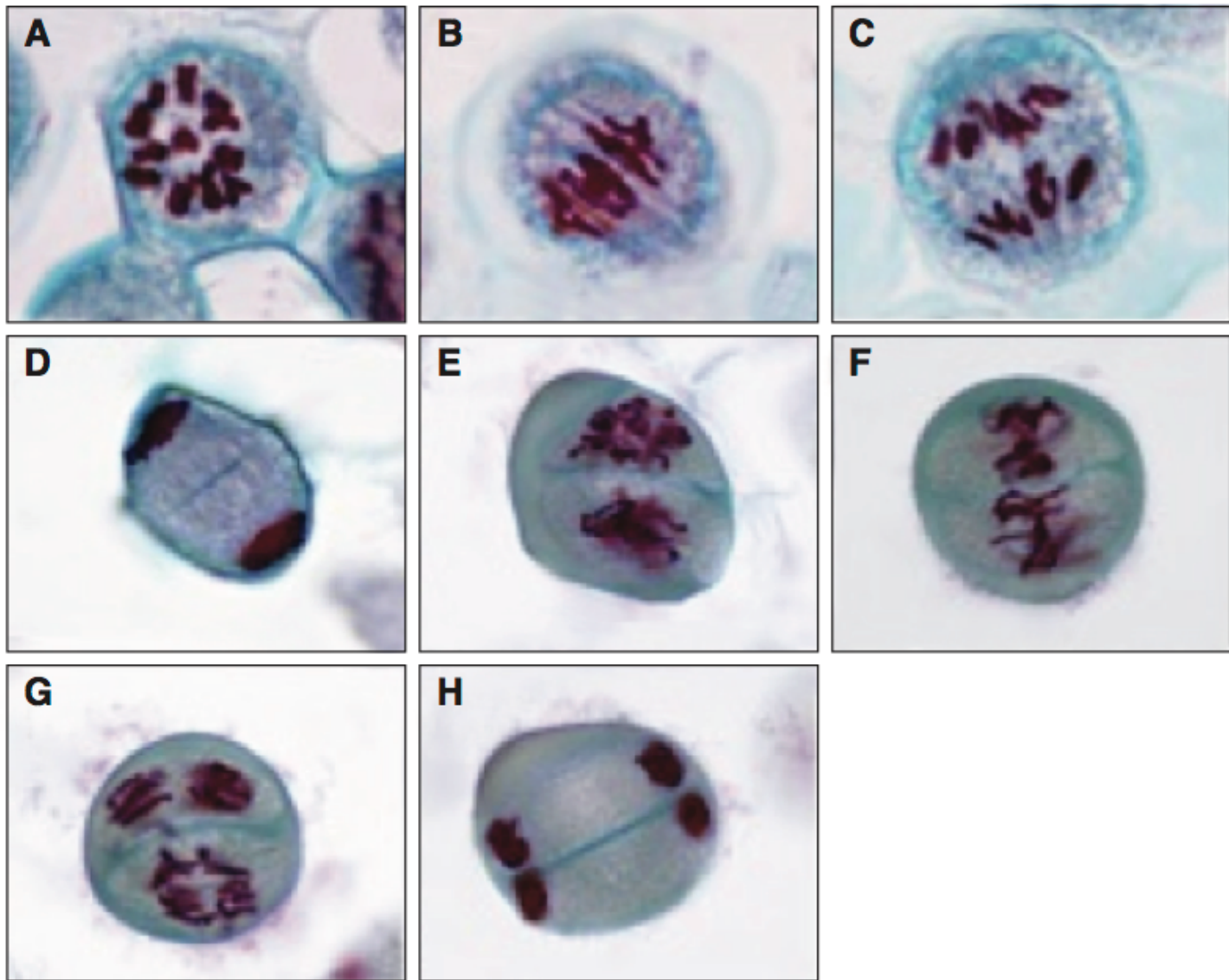


Fig. 3.22

Diploid to Haploid Nuclei

How many genomes (chromatids) **per nucleus**?

How many chromosomes of each pair?

Diploid to Haploid Nuclei

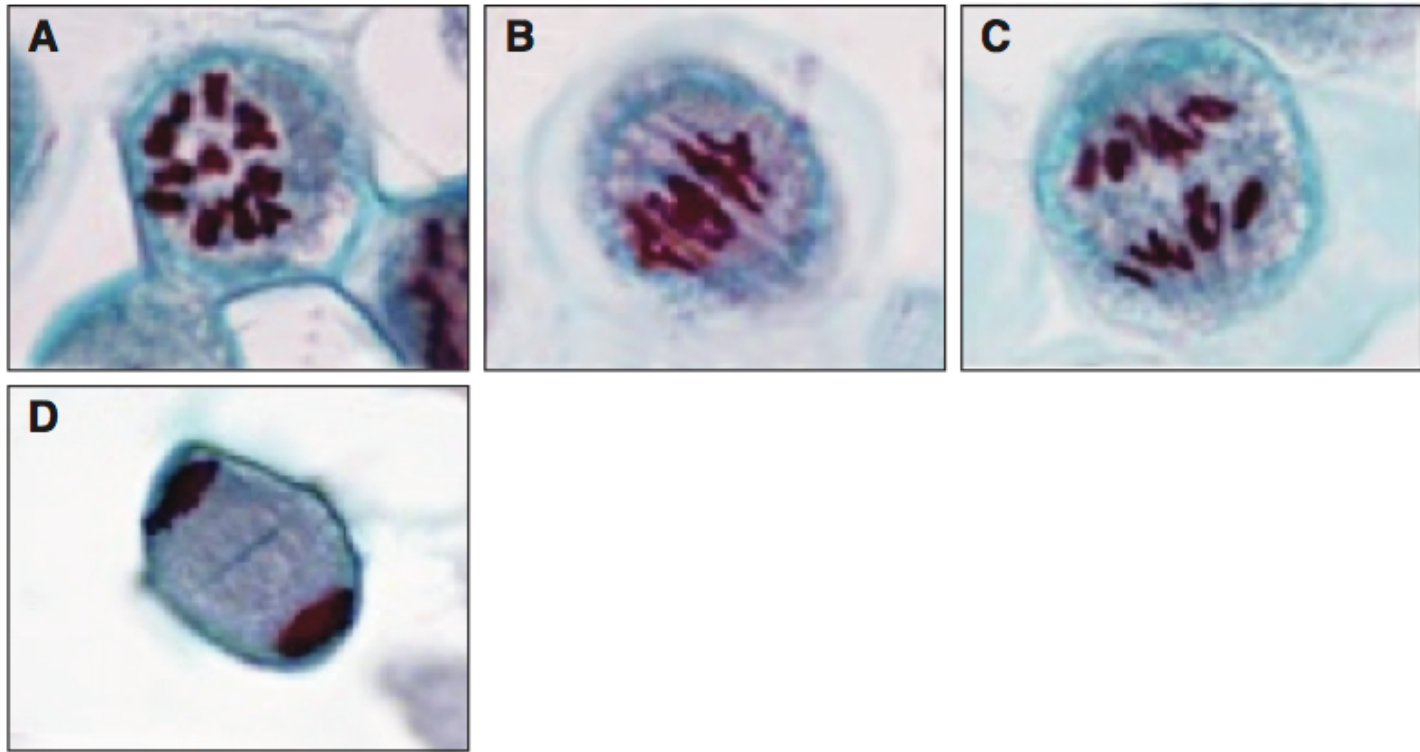


Fig. 3.22

Diploid to Haploid Nuclei

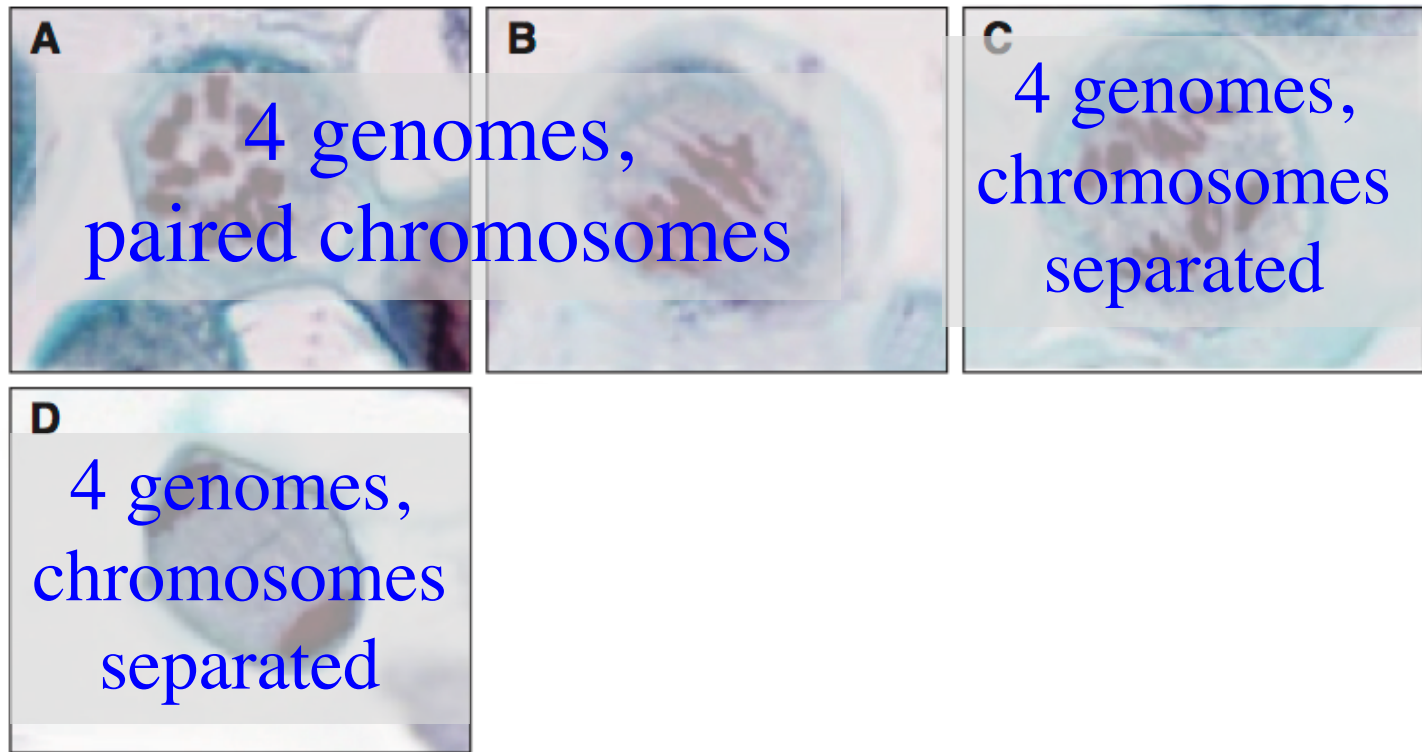


Fig. 3.22

Diploid to Haploid Nuclei

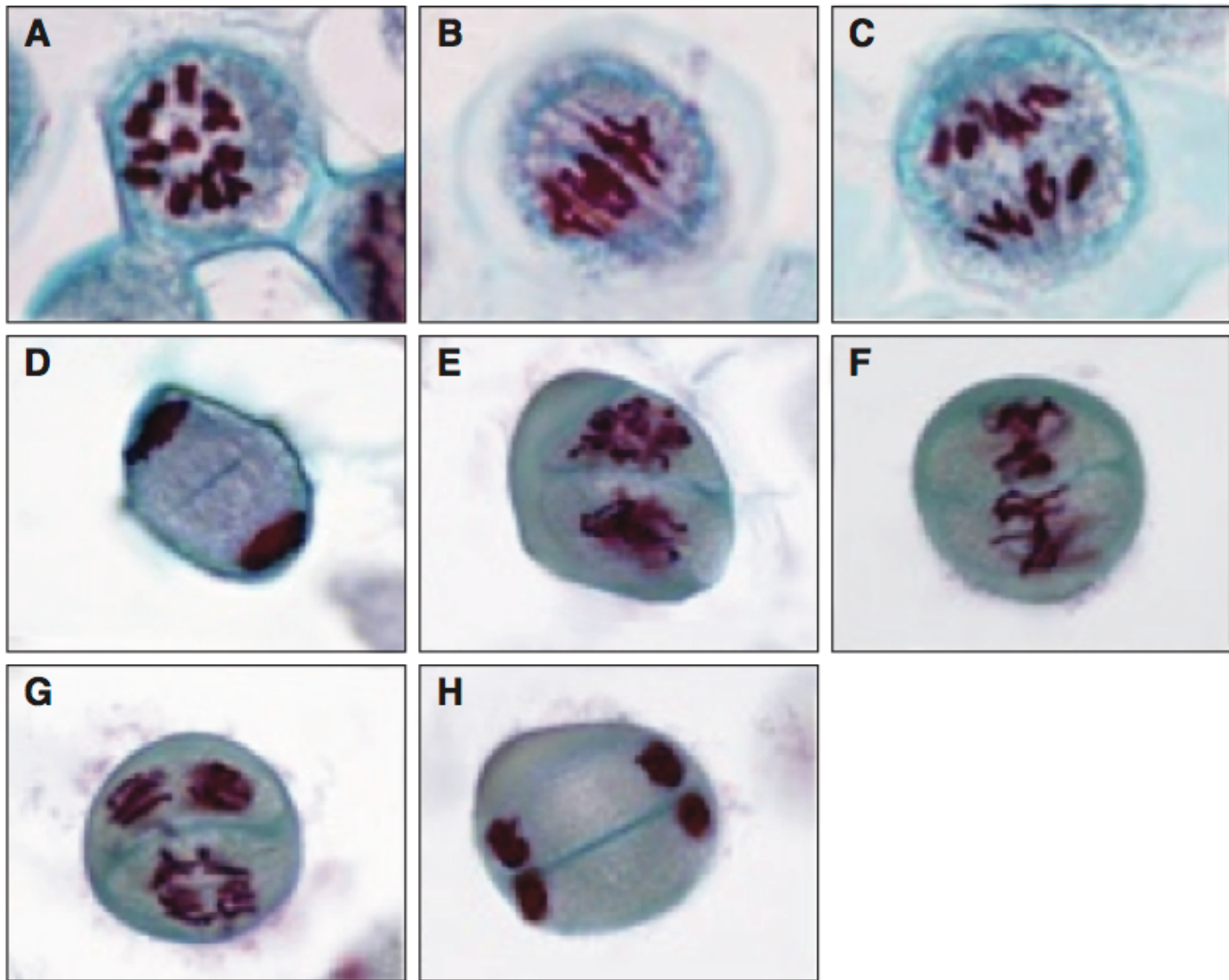


Fig. 3.22

Diploid to Haploid Nuclei

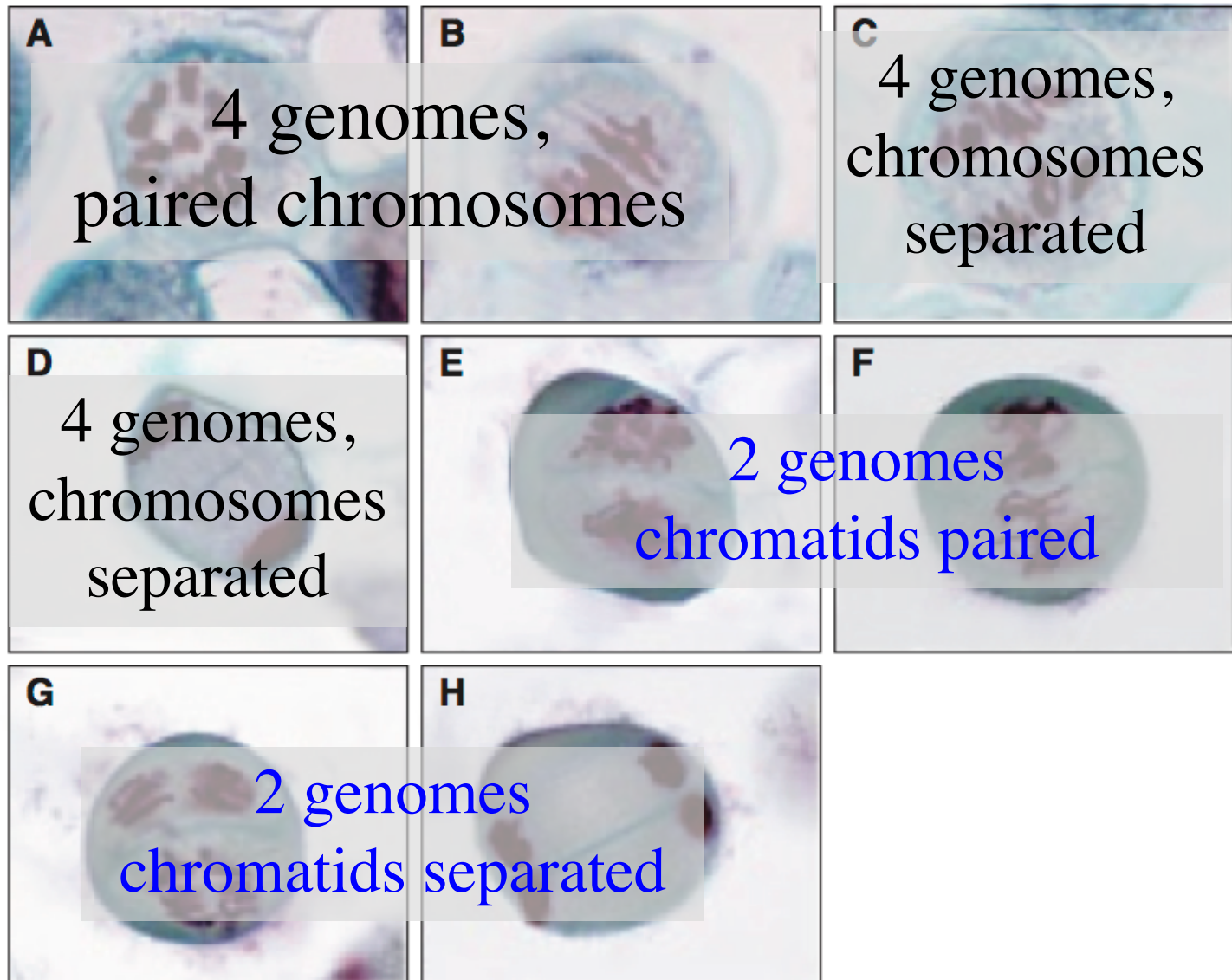
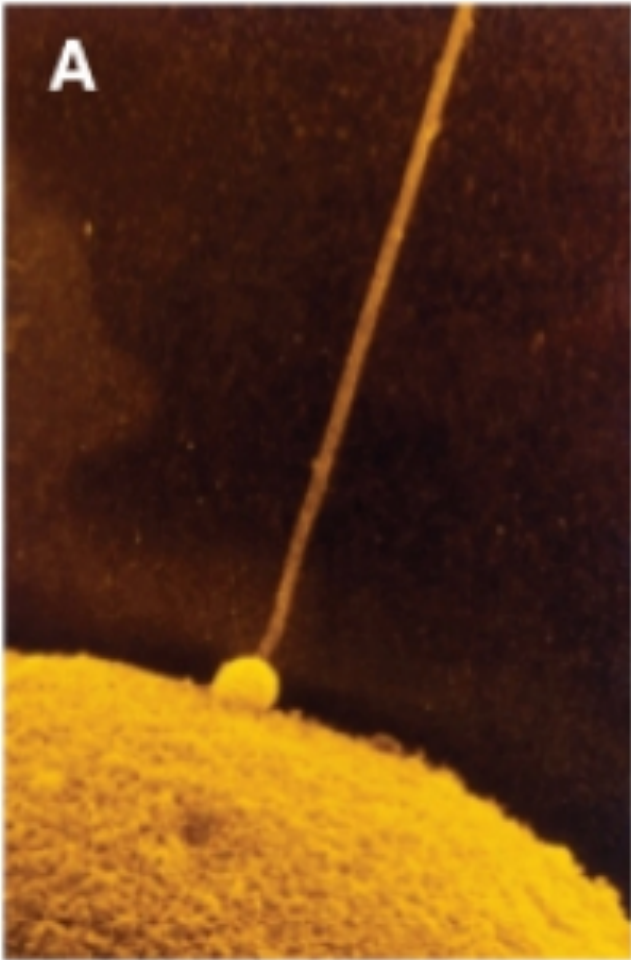


Fig. 3.22

Sea Urchin Fertilization



sperm compete for egg binding

It is *random* which sperm will succeed.

<http://www.youtube.com/watch?v=T6BtSMerBmw>

Fig. 3.24

Sea Urchin Fertilization



<http://www.youtube.com/watch?v=T6BtSMerBmw>

Fig. 3.24

Sea Urchin Fertilization



<http://www.youtube.com/watch?v=T6BtSMerBmw>

Fig. 3.24

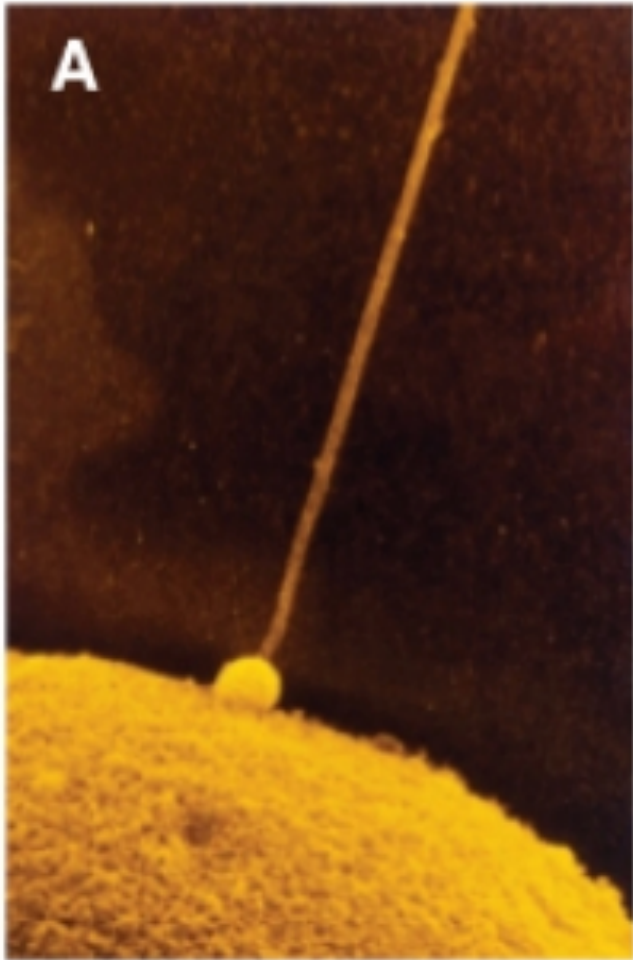
Sea Urchin Fertilization



<http://www.youtube.com/watch?v=T6BtSMerBmw>

Fig. 3.24

Sea Urchin Fertilization



<http://www.youtube.com/watch?v=T6BtSMerBmw>

Fig. 3.24

What is the cost of genetic perfection?



ELSI Fig. 3.2

http://www.vangoghgallery.com/in_his_steps/images/selfportrait.jpg

http://commons.wikimedia.org/wiki/File:Vincent_van_Gogh_photo_cropped.jpg