Concepts of Biology. Lecture 29

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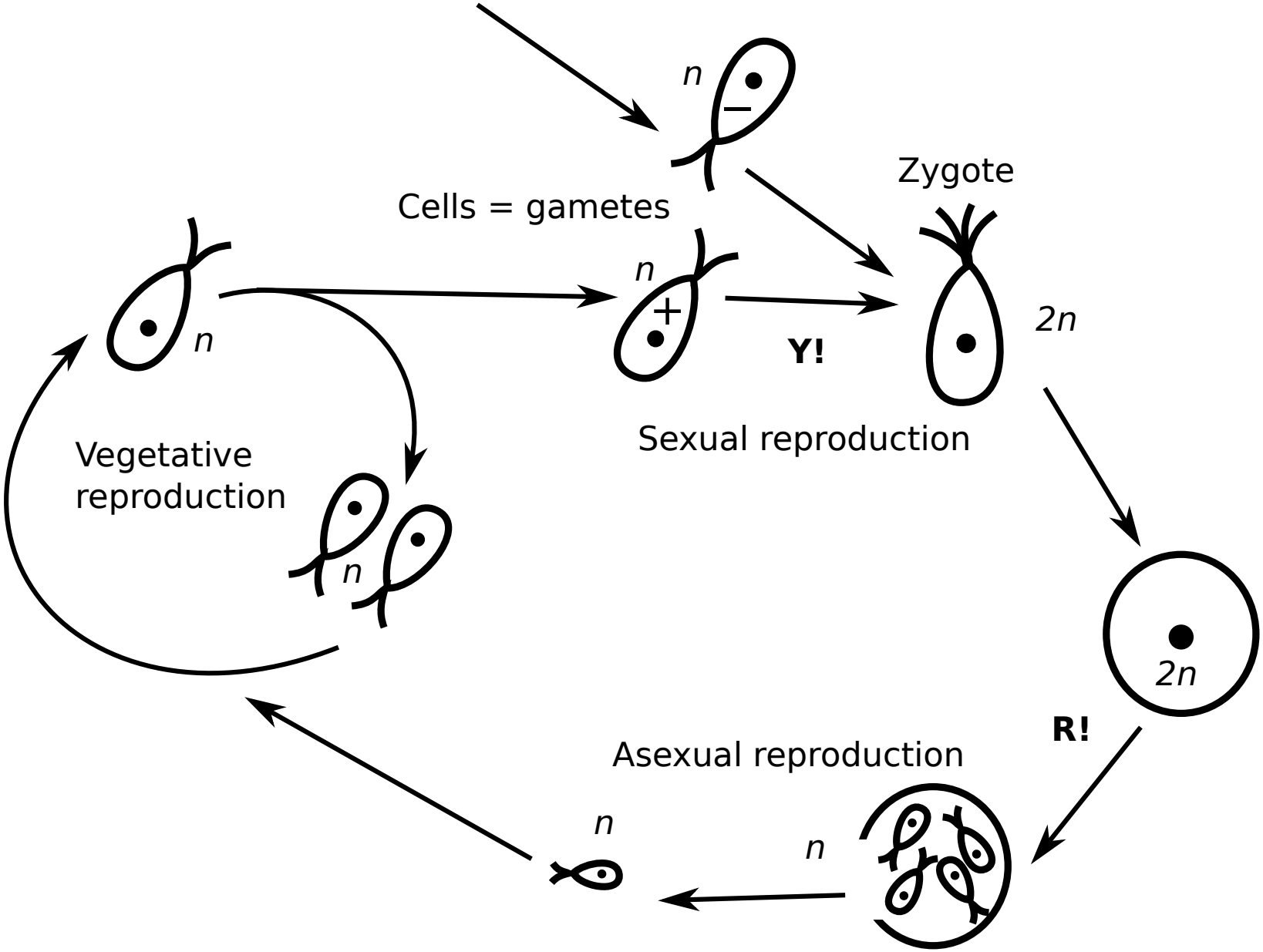
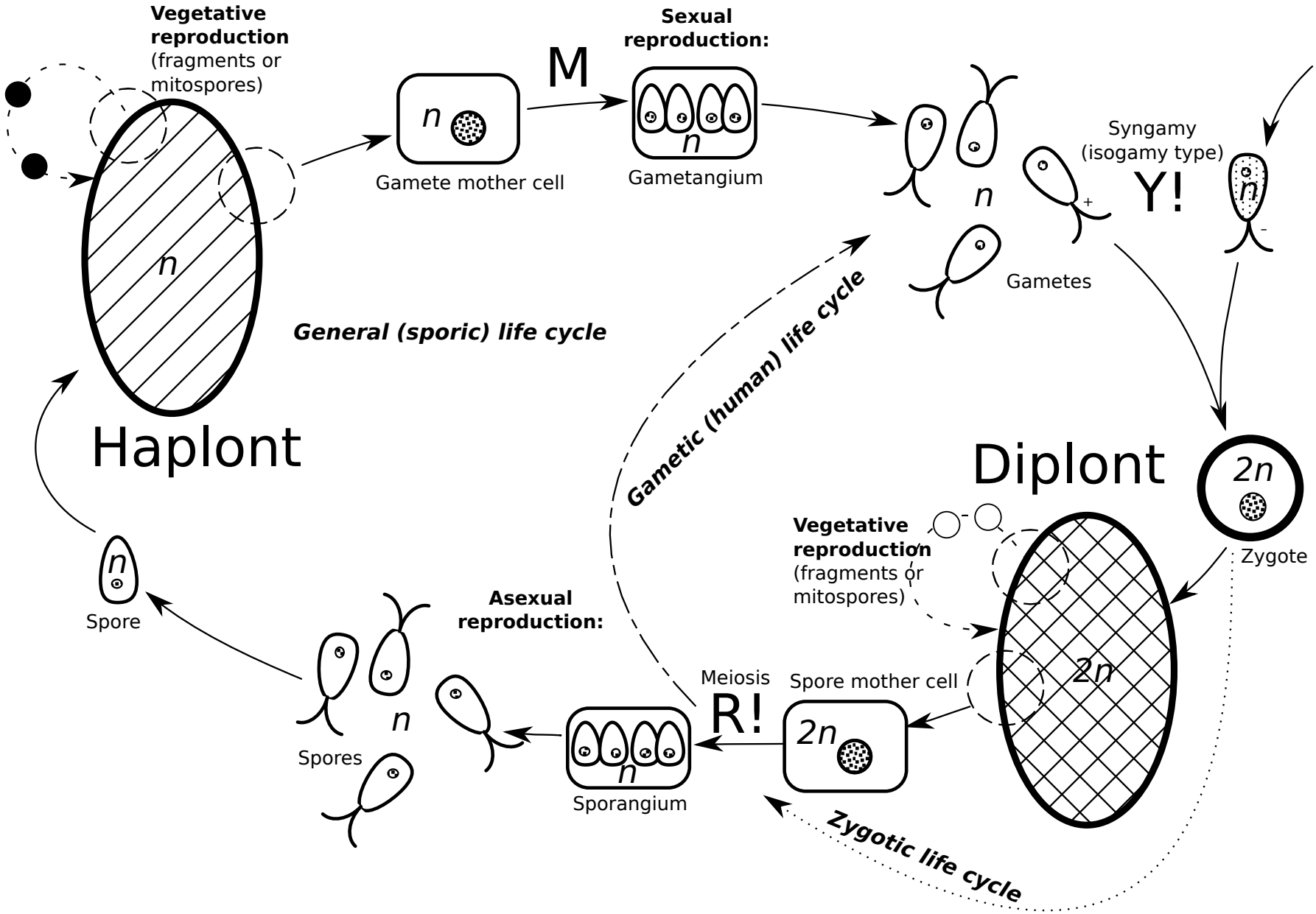
November 14, 2014

Outline

Life cycle of unicellular organism



Life cycle of multicellular organism



Genetics and inheritance

Life cycle

Terms associated with life cycles

- mitosis, meiosis (R!), syngamy (Y!)
- vegetative reproduction (cloning)
- result of syngamy: zygote
- participant of syngamy: gamete
- smaller gamete: male, bigger gamete: female
- movable male gamete: spermatozoon (sperm), motionless female gamete: oocyte (egg cell)
- haplont and diplont
- spores
- sporic life cycle and gametic life cycle

Genetics and inheritance

Gregor Mendel

Pea

- Self-pollinated: to cross, one needs to pollinate it artificially
- Contrasting characters (flower color, seed coat color, seed coat surface, plant height, pod wall color etc.)
- Pure lines: always produce the same characters

First and second generations

- First: all the same
- Second: 3/4 like one parent and 1/4 like another parent

Theory

- Two different factors (variants of one character)
- Factors are paired in plant but separated in gametes
- One factor is dominant

Theory and explanation

- Two different factors (variants of one character): *two variants (**alleles**) of one **gene***
- Factors are paired in plant but separated in gametes: *meiosis*
- One factor is dominant: *one variant is working DNA, the other is not*

Genes and characters

- Genotype and phenotype
- Homozygous and heterozygous plants
- 3/4 and 1/4 is the result of **combining probabilities**

Experiment with two characters (dihybrid crossing)

- First generation: all same
- Second generation: 9/16 like one parent, 1/16 like another and two new groups (3/16 and 3/16) with intermediate combinations of characters—**recombinants**

Theory

- Different characters are separating between gametes independently
- This is because different characters are located in different places

Theory and explanation

- Different characters are separating between gametes independently: *anaphase I of meiosis*
- This is because different characters are located in different places: *in different pairs of chromosomes*

Summary

- While in the life cycle of plants (“sporic”), diplont and haplont interleave, in animal life cycle (“gametic”) haplont is reduced.
- Mendelian (classic) genetics is based on segregation, dominance and independent assortment

For Further Reading

Mendelian genetics.

`http://en.wikipedia.org/wiki/Mendelian_inheritance`