Introduction to Botany. Lecture 15

Alexey Shipunov

Minot State University

September 30, 2016

Outline

1. Questions and answers
   - Quiz
2. Life cycle
   - Meiosis (R!)

Outline

1. Questions and answers
   - Quiz
2. Life cycle
   - Meiosis (R!)

Questions and answers

Quiz

Final question (3 points)

Before syngamy, every cell has 3 picograms of DNA. How many DNA are in zygote immediately after syngamy?

Final question (3 points)

Before syngamy, every cell has 3 picograms of DNA. How many DNA are in zygote immediately after syngamy?

- $3 + 3 = 6$ picograms

Life cycle

Meiosis (R!)

Stages of meiosis

- First division: reductive part
  - Prophase I: homologous chromosomes form pairs (**synapses**) and start to exchange DNA (**crossing-over**)
  - Metaphase I
  - Anaphase I: homologous chromosomes will go *independently* to different poles
  - Telophase I becomes Prophase II, without interphase (and typically without cytokinesis)
- Second division: equal part (similar to mitosis)
  - Prophase II
  - Metaphase II
  - Anaphase II
  - Telophase II

Real-world meiosis, 1st division

Real-world meiosis, 2nd division

Polyploids

- If for some reason, meiosis will not run correctly, one of resulted cells could receive double set of chromosomes ($2n$ instead of n)
- If this cell goes to syngamy, resulted zygote will have $3n$ chromosomes
- Cells with $> 2n$ chromosomes are **polyploids**

Summary

- Meiosis has two stages: first to reduce ploidy, second to split exact copies of DNA

Final question (2 points)

Final question (2 points)

Why does meiosis happen in two stages?

For Further Reading

A. Shipunov.
Introduction to Botany [Electronic resource].
2016.
Mode of access:
http://ashipunov.info/shipunov/school/biol_154