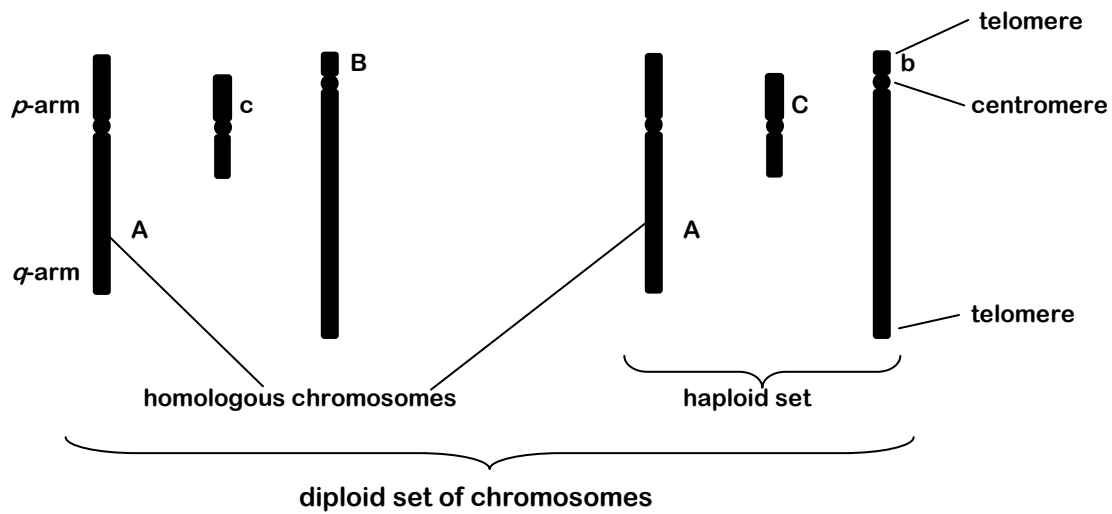


Lecture 2

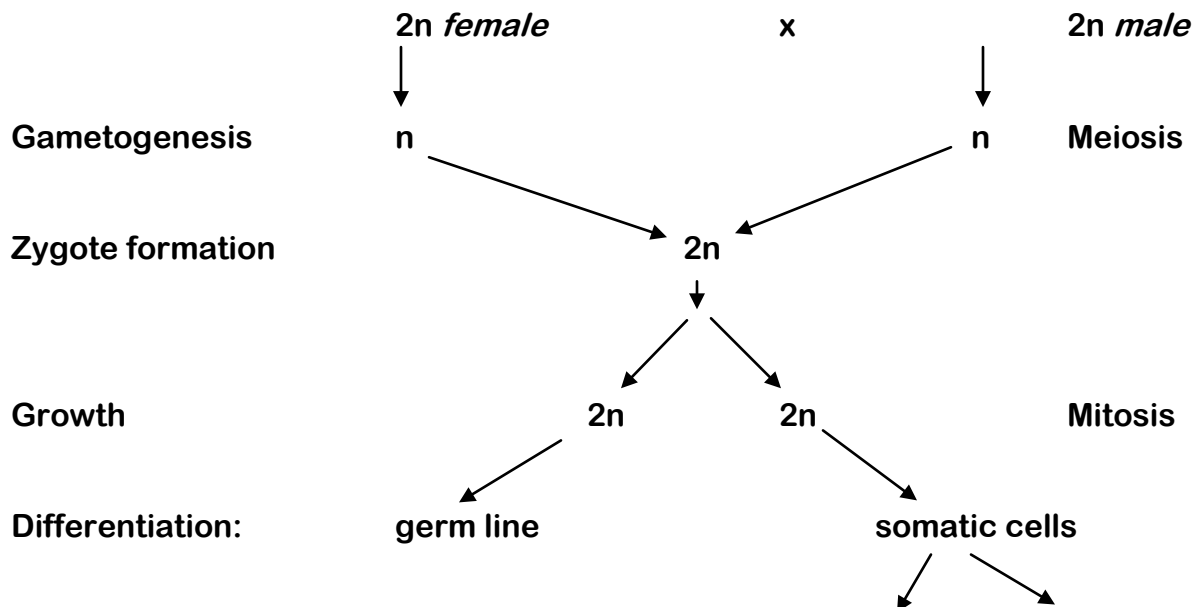
Mitosis and Meiosis

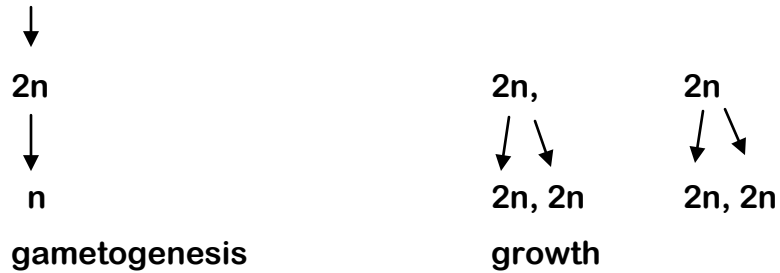
1. Chromosomes
2. Diploid life cycle
3. Cell cycle
4. Mitosis
5. Meiosis
6. Parallel behavior of genes and chromosomes

1. Chromosomes



2. Diploid life cycle



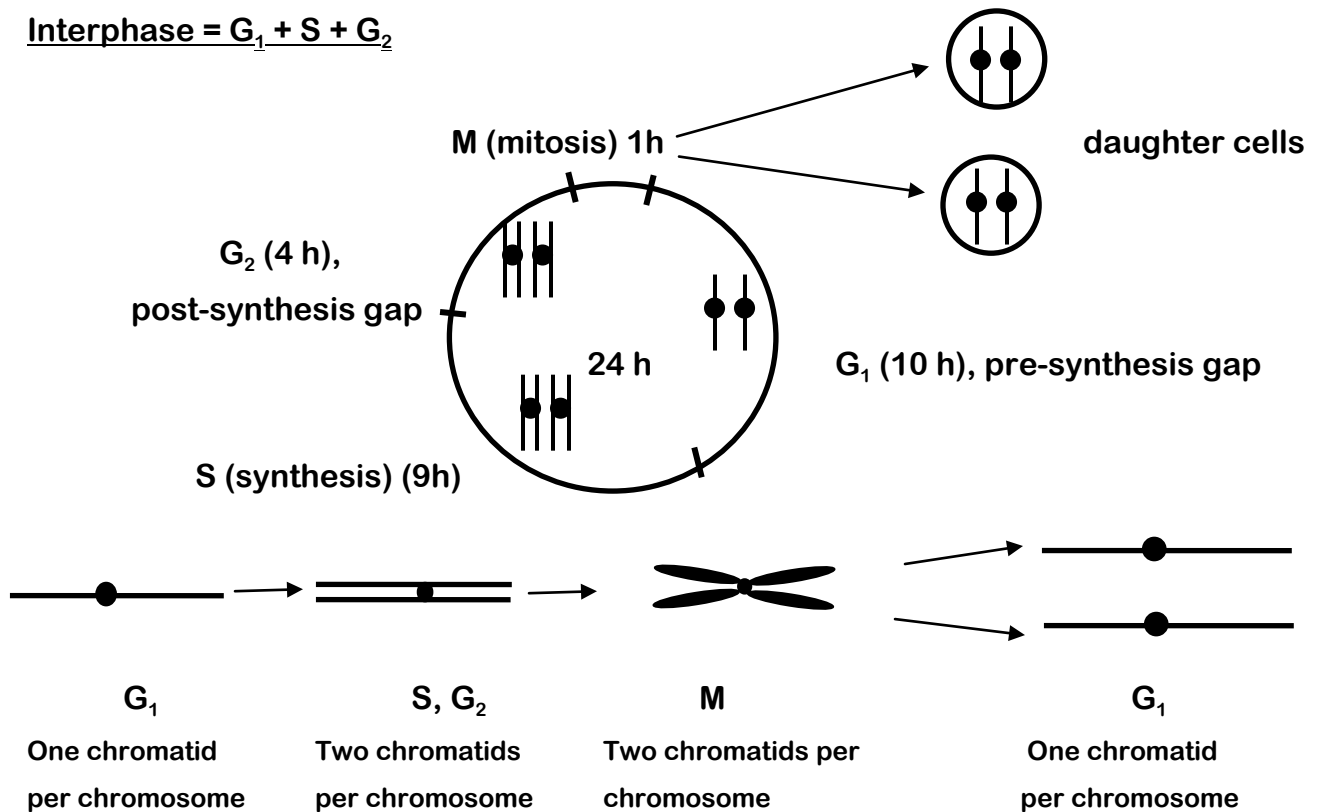


	<u>Meiosis:</u>	<u>Mitosis:</u>
Occurs:	in germ line cells (meiocytes)	in many types of cells (except for some differentiated)
Ploidy:	reduces ploidy (from $2n$ to $n$ )	produces identical progeny
Occurs:	only in diploid cells	in haploid and diploid cells
Involves:	two cell divisions	one cell division

### 3. Cell cycle

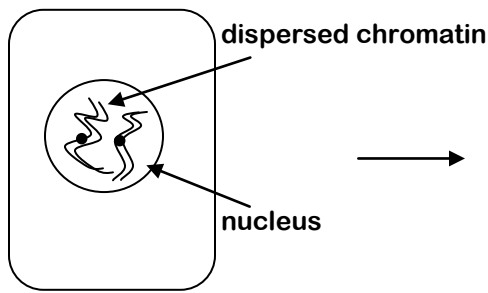
Cell cycle = mitosis + interphase

Interphase =  $G_1 + S + G_2$

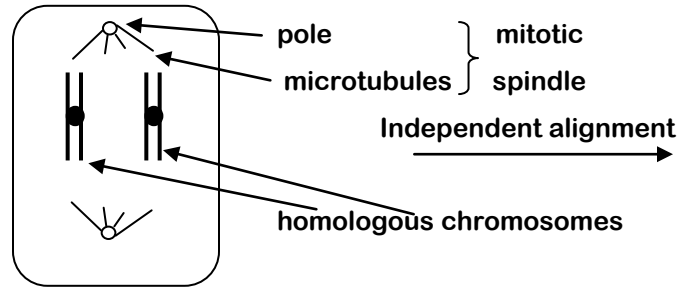


4. Stages of mitosis (dynamic process, boundaries between stages are blurred):

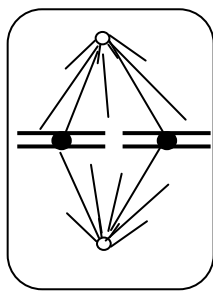
**Interphase** (G<sub>1</sub>, S, G<sub>2</sub>)



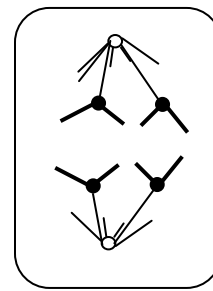
**Prophase**



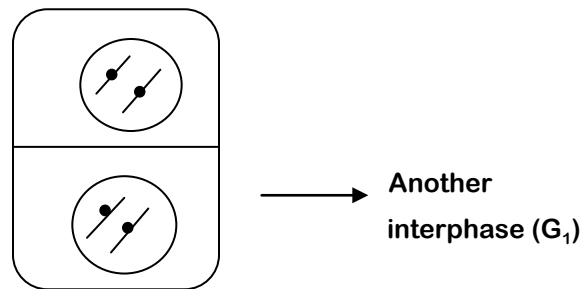
**Metaphase**



**Anaphase**



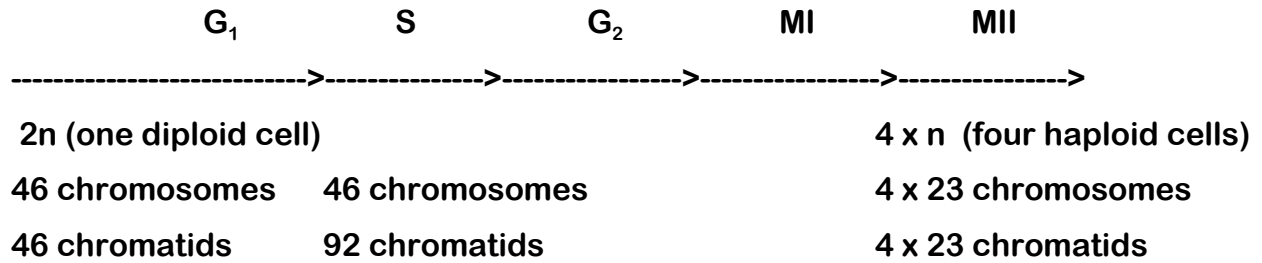
**Telophase**



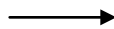
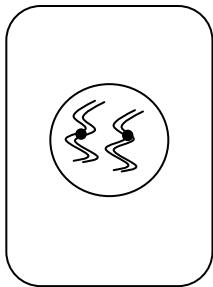
Genetic consequences of mitosis:

it generates two exact copies of the parental cell

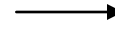
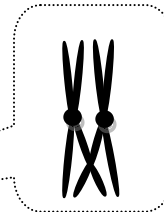
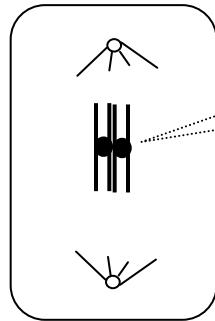
5. Stages of meiosis:



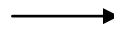
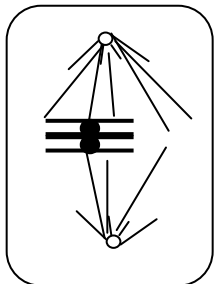
**Interphase** (G<sub>1</sub>, S, G<sub>2</sub>)



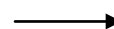
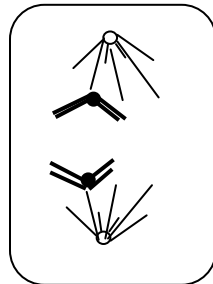
**Prophase I**



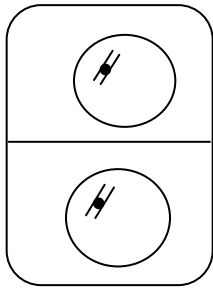
**Metaphase I**



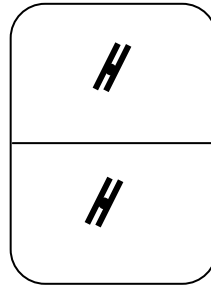
**Anaphase I**



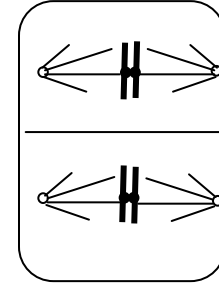
**Telophase I**



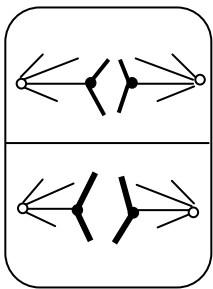
**Prophase II**



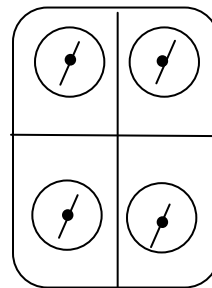
**Metaphase II**



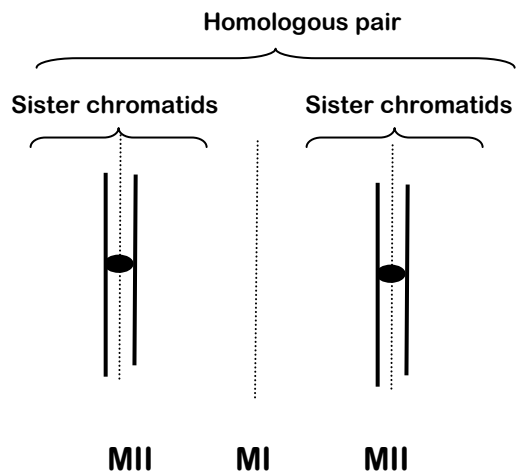
**Anaphase II**



**Telophase II**



One replication and two divisions:  $2n \times 2 \rightarrow 4 \times n$



In Meiosis I the homologs pair up and separate but centromeres do not replicate, thus the number of chromosome reduces in two ==> **reductional** division.  
 In Meiosis II the centromeres divide causing separation of sister chromatids, thus maintaining the same number of chromosomes --> **equational** division.

6. Parallel behavior of genes and chromosomes

Meiosis in an F<sub>1</sub> heterozygote of Mendel's crosses:

