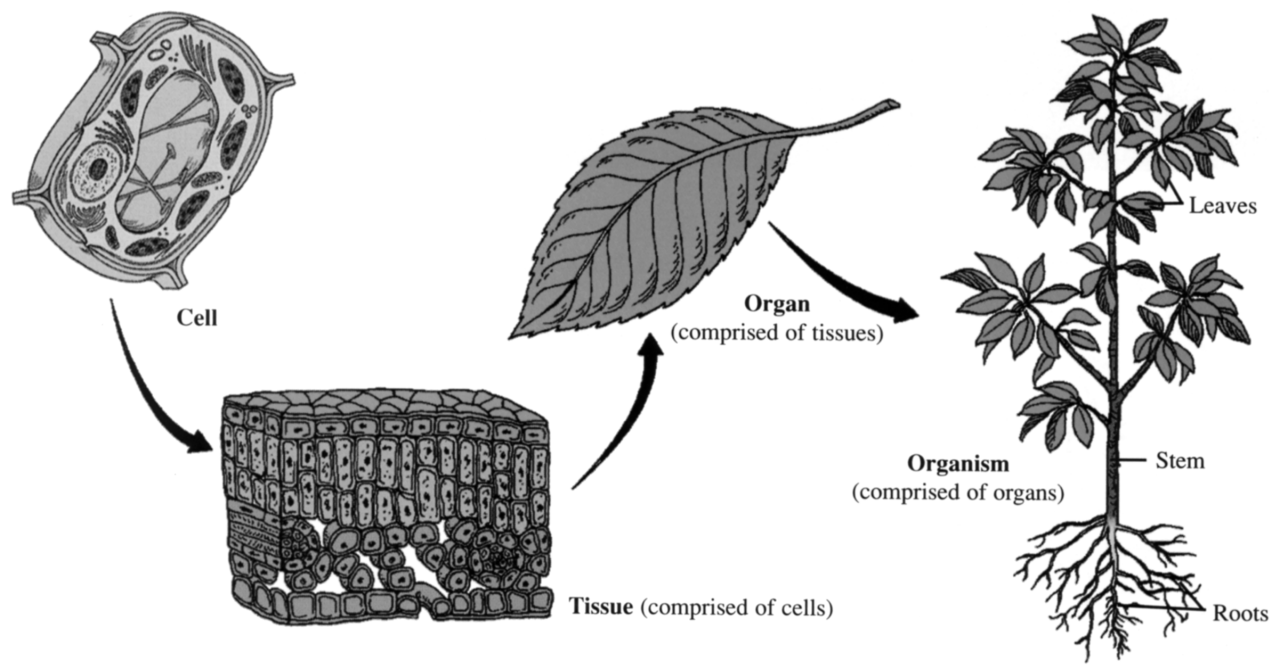


Figure 7. Organiztional hierarchy of a plant. Cells of a single type are combined to form tissues. Tissues combine to form organs which in turn comprise the whole organism.

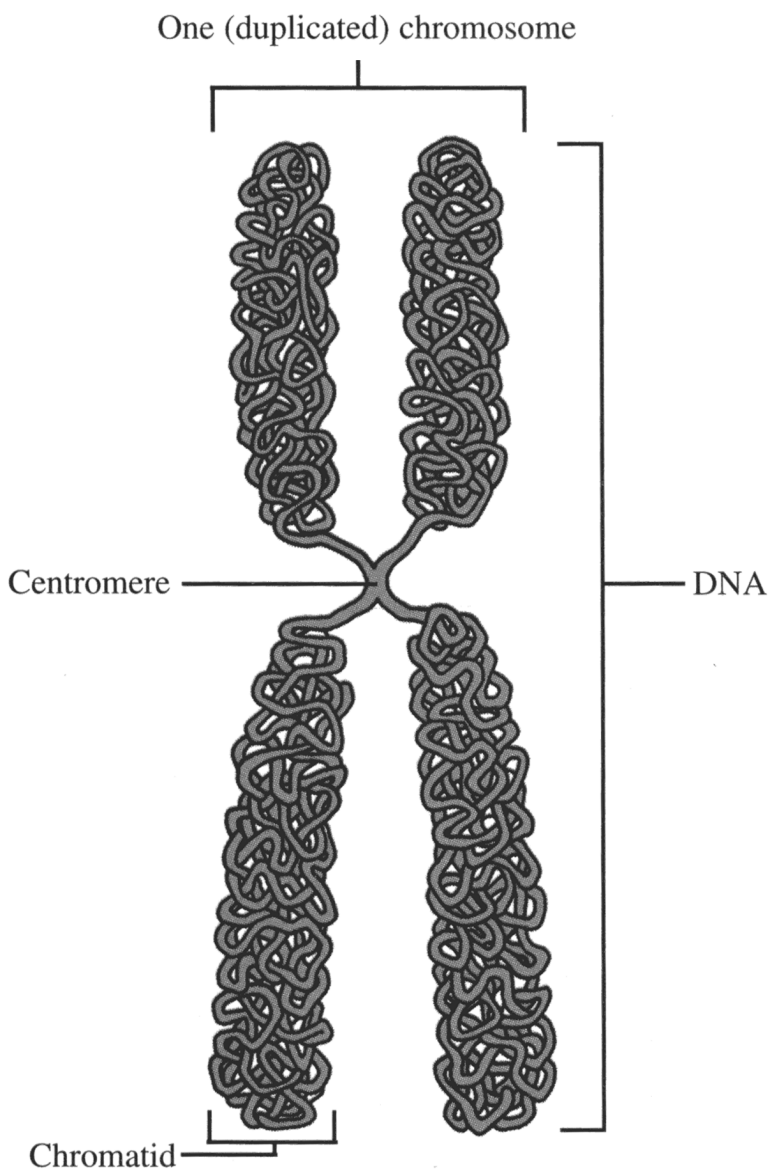


Figure 8. Chromosome structure. Each *replicated* chromosome consists of two identical *chromatids* attached at the centrally located and constricted *centromere*. Each chromatid is comprised of DNA encoding the information for many genes.

Figure 9. Human Karyotype. The full set of replicated chromosomes in a human includes 22 somatic chromosomes and 1 pair of sexual chromosomes. This karotype is from a male.

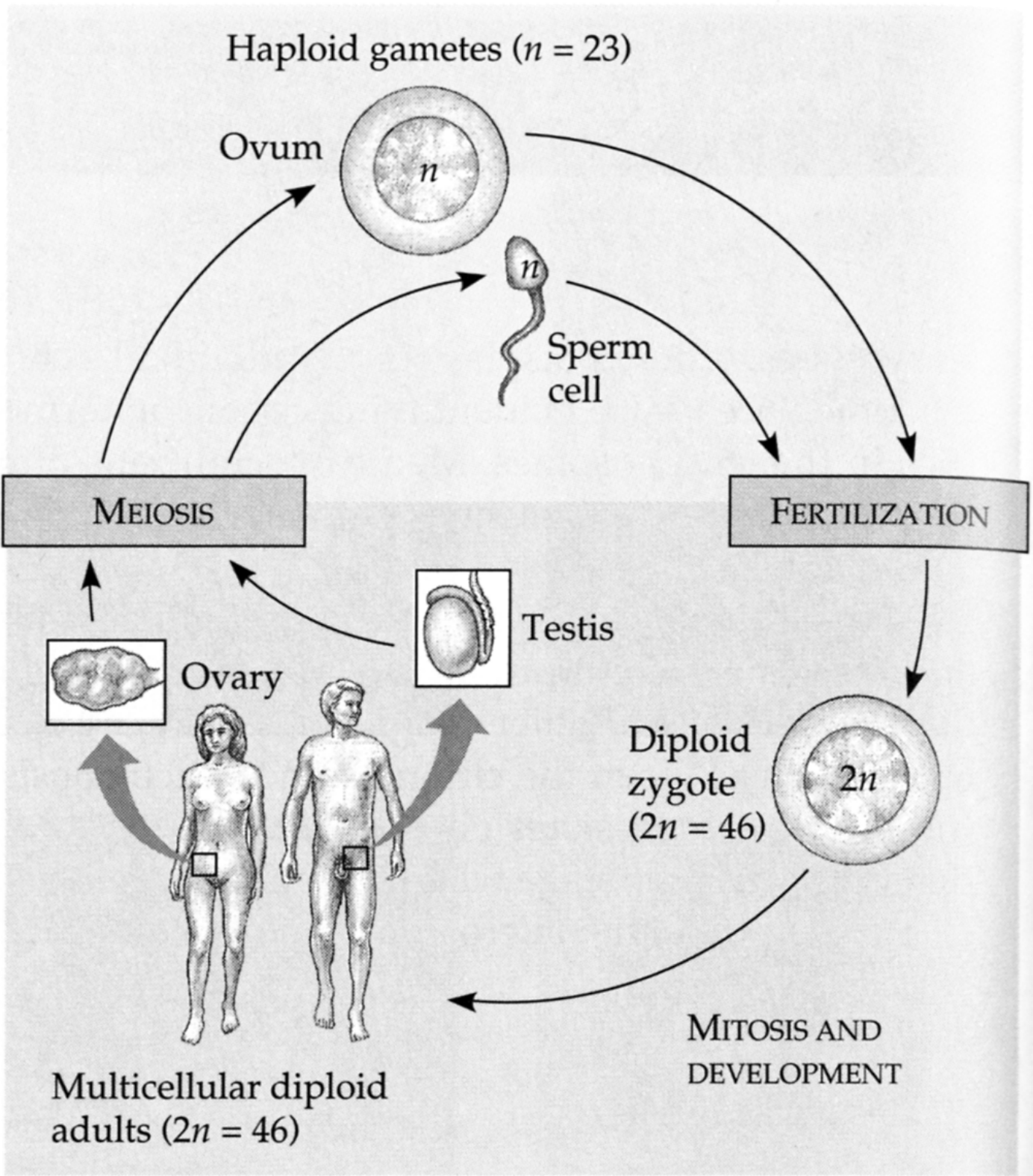
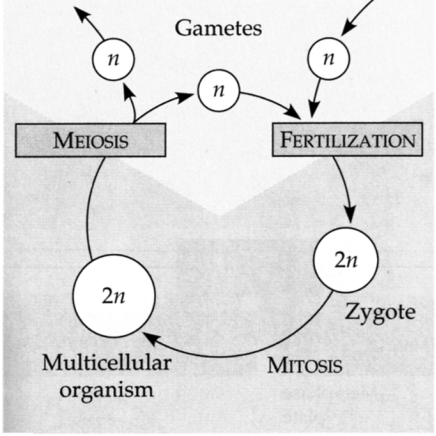
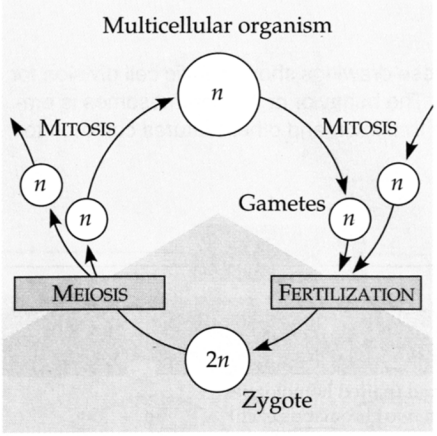


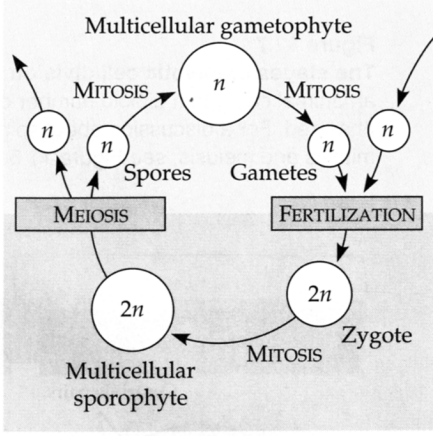
Figure 10. The human life cycle. Each generation the doubling of chromosome number resulting from fertilization is offset by the halving of chromosome number during meisosis. Human haploid cells have 23 chromosomes (n = 23) while the zygote and all somatic cells have 46 (2n = 46).



Animals



Some fungi and some algae



Plants and some algae

Figure 11. Life cyle dominance. Sexual life cycles differ in the timing of meiosis and fertilization (syngamy). The common pattern of all sexual life cycles is the alternation of meiosis and fertilization, contributing to genetic variation among offspring. In most animal life cycles, the complex multicellular stage is diploid (2n): a diploid dominance life cycle. In most fungi and algae and some primitive plants, the multicellular organism is haploid (n): a haploid dominance life cycle. In most plants, multicellular organisms are formed during both the diploid and haploid phases of the life cycle. This phenomenon is called *Alternation of Generations*.

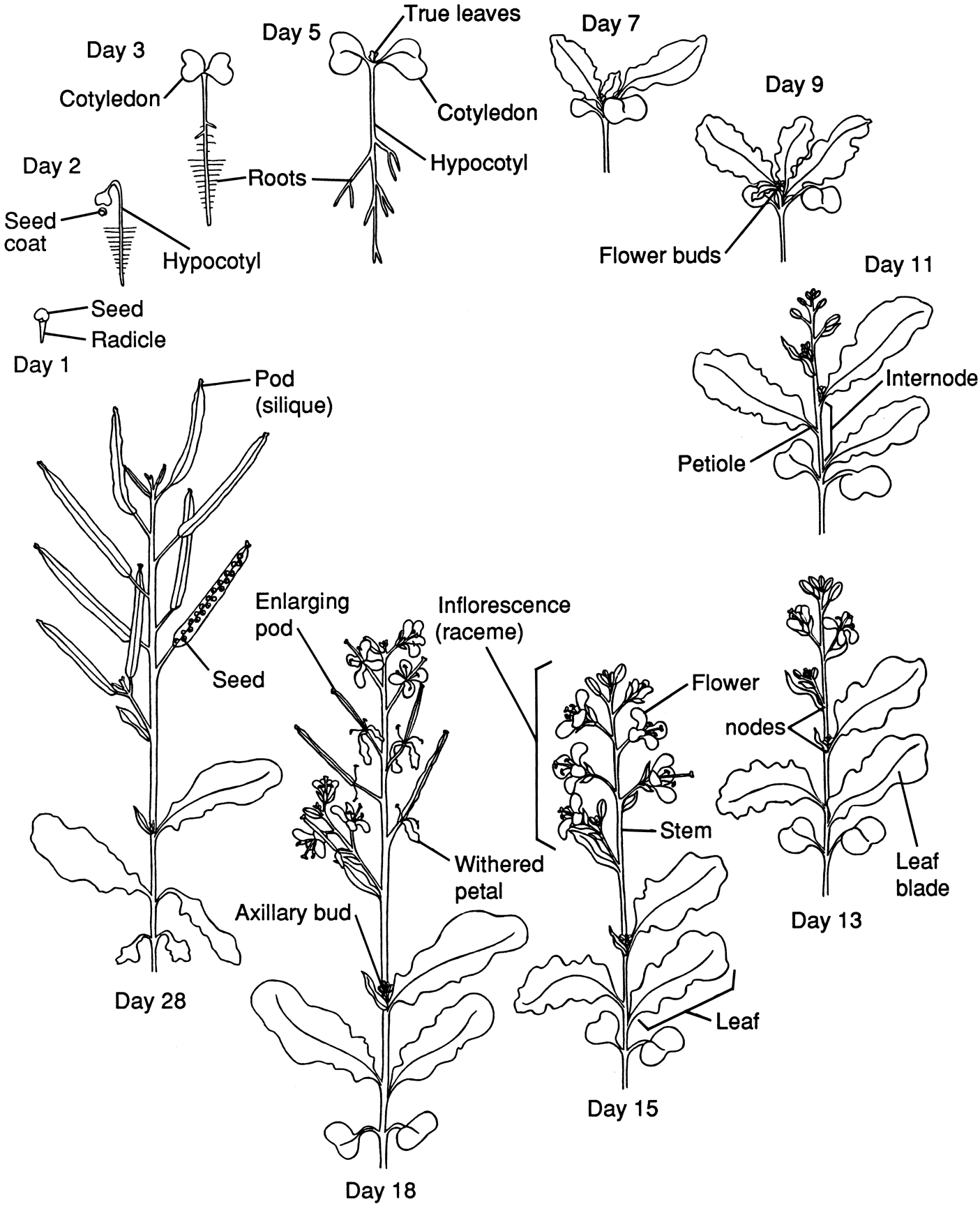


Figure 12. Life cycle and development of the rapid-cycling cultivar of *Brassica rapa*.

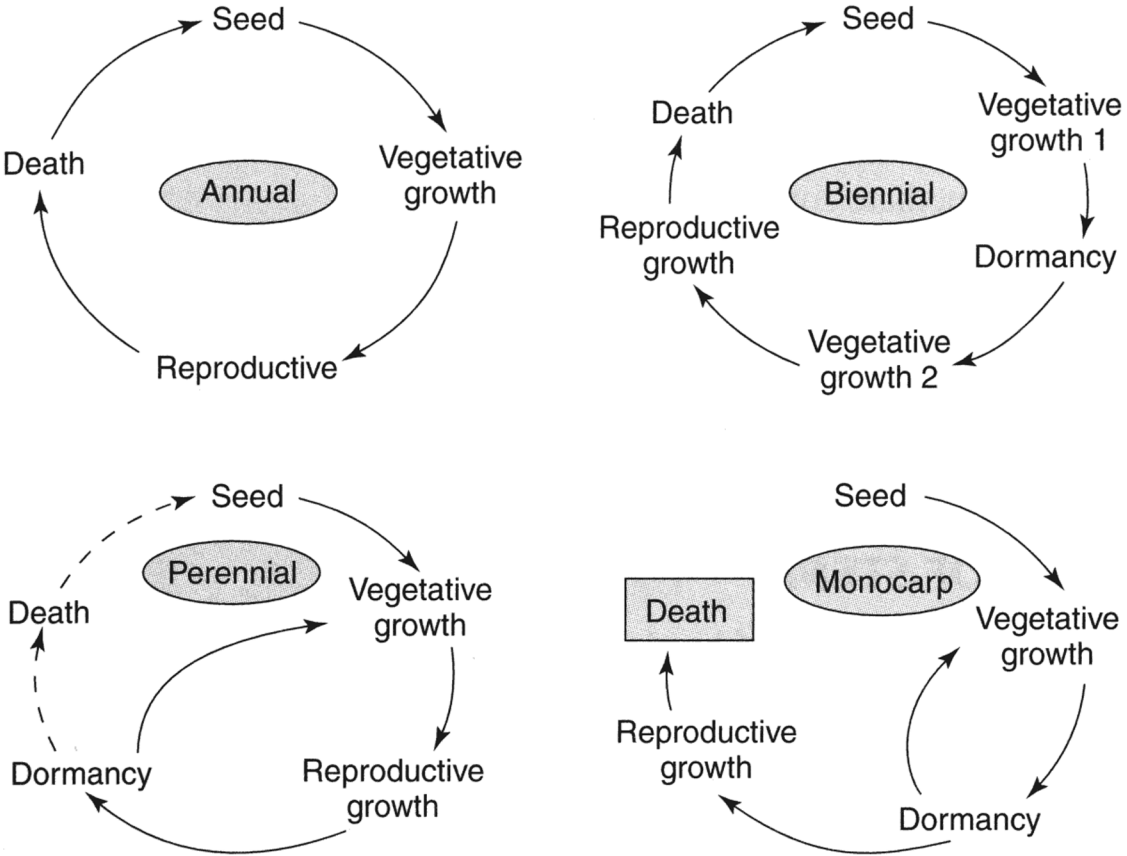


FIGURE 13. Duration of plant life cycles. Annual plants complete their life cycle in 1 growing season or year, including both vegetative reproductive growth. Biennial plants complete their life cycle in 2 growing seasons or years, the first dedicated to vegatative growth and the second to flowering, reproduction and death. Perennial plants grow for many years without replanting and undergo many vegetative and reproductive growth cycles. Monocarps live for many years and vegetative growth cycles, but flower and reproduce only once and then die, with new plants arising on the root systems of the old plants.

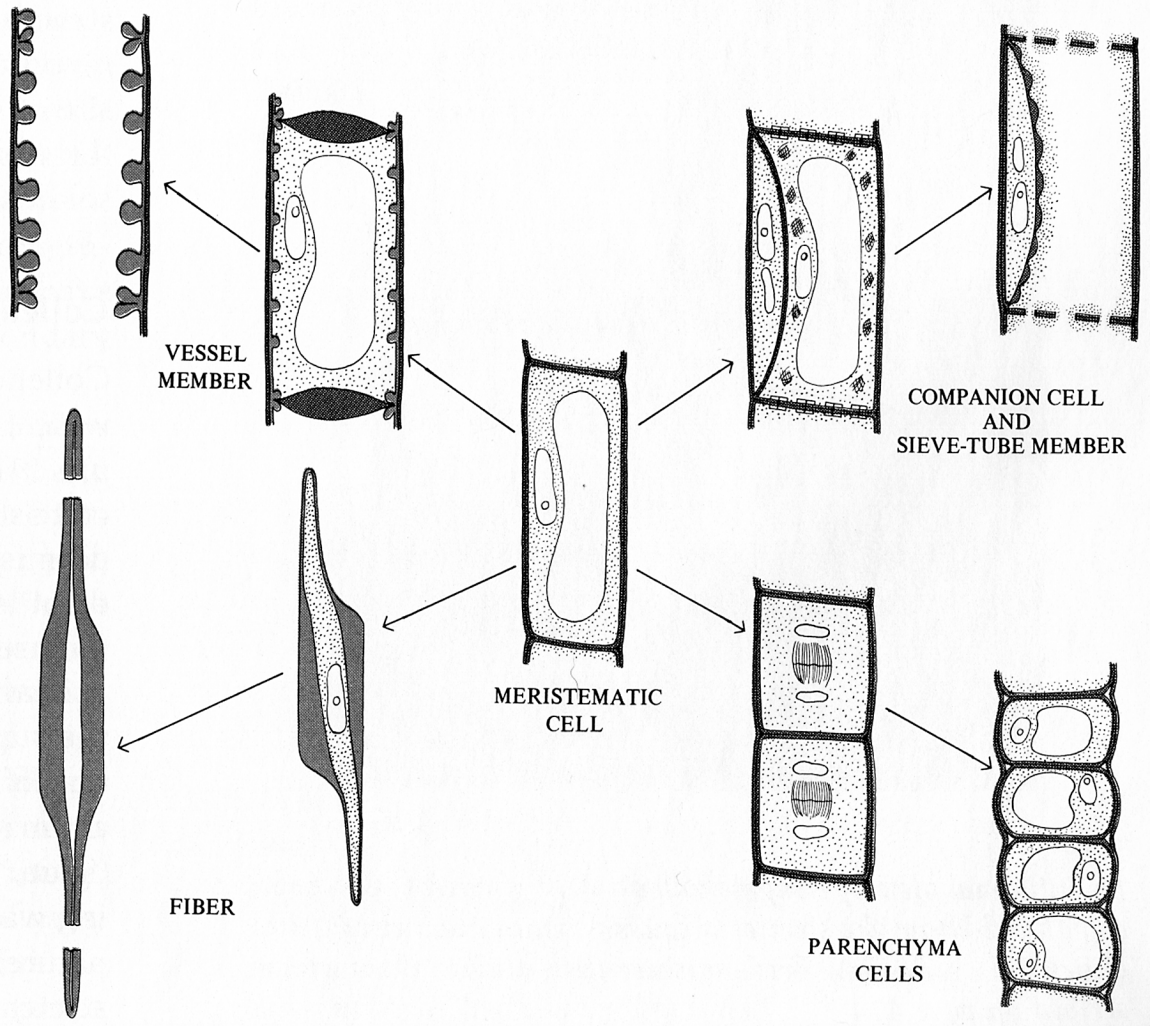
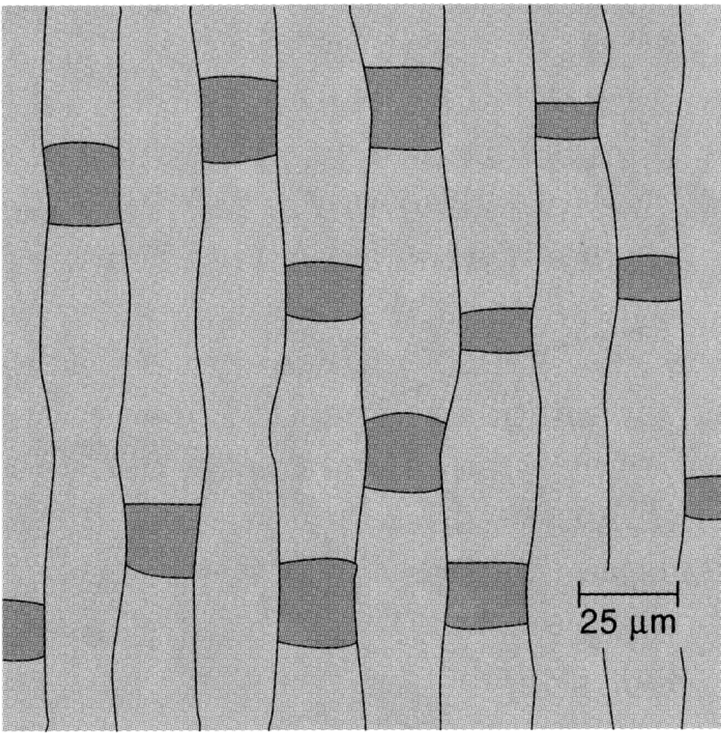
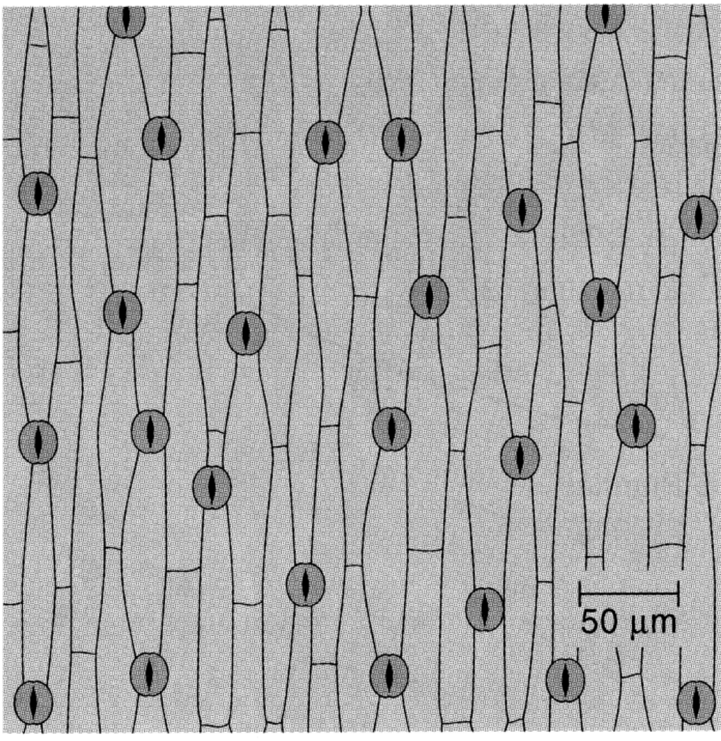


Figure 14. Cell differentiation. An undifferentiated meristematic cell is totipotent. It can differentiate to form any other cell type in a plant. Here, a basal meristematic cell could differentiate to form xylem, phloem, parenchyma, or sclerenchyma cells.



(a)



(b)

Figure 15. Stomatal differentiation in leaves. (a) Early in development, epidermal cells divide asymmetrically to form small stomatal mother cells and larger epidermal cells. (b) This cell lineage produces regularly spaced stomata to regulate gas exchange.

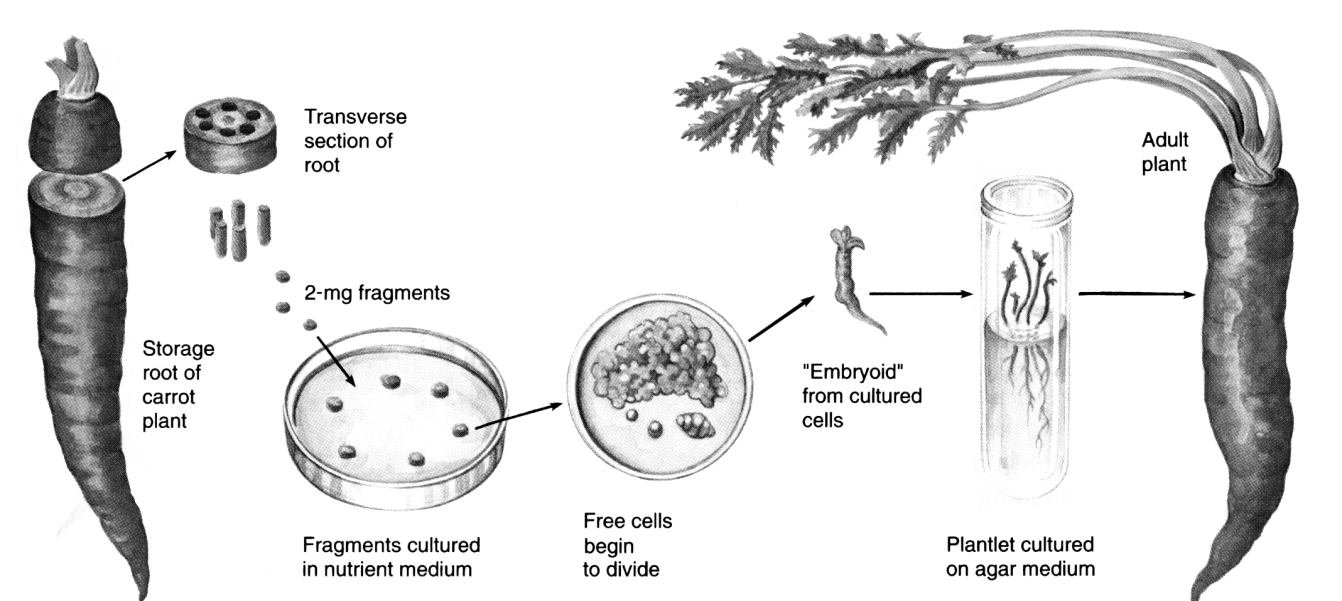


Figure 16. Plant tissue culture demonstrates the nature of cell totipotency in plants.