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Editorial

Editorial Note on Chromosome

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EDITORIAL

The chromosome is a thin threadlike component of the cell that holds genetic information in the form of genes. Any chromosome's compactness is a distinctive feature. The 46 chromosomes are observed in human cells, for example, have a combined length of 200 nm (1 nm=109 metre); if the chromosomes were unravelled, the genetic material contained within them would be nearly 2 metres (6.5 feet) long. Chromosome compactness aids in the organisation of genetic material during cell division and allows it to fit inside structures such as the nucleus of a cell. The average diameter of chromosome is about 5 to 10 m (1 m=0.001 mm, or 0.000039 inch), and the polygonal head of a virus particle, which is about a diameter of only 20 to 30 nm.

The form and position of chromosomes are one of the most notable variations between viruses, prokaryotes, and eukaryotes. Non-living viruses are chromosomes made up of DNA (deoxyribonucleic acid) or RNA (ribonucleic acid) that are tightly packed into the viral head. In prokaryotic species, chromosomes are formed entirely of DNA (such as bacteria and blue-green algae). The solitary chromosome of a prokaryotic cell is not protected by a nuclear membrane. In eukaryotes, the chromosomes are stored in a membrane-bound cell nucleus. The chromosomes of eukaryotic cells are mainly made up of DNA bound to a protein core. They include RNA as well. The rest of this page is about eukaryotic chromosomes.

The number of chromosomes in each eukaryotic species is unique (chromosome number). In asexually reproducing species, the chromosome number is the same in all of the organism's cells. The number of chromosomes in body (somatic) cells is diploid (2n; a pair of each chromosome), which is double the haploid (1n) number seen in sex cells, or gametes, in sexually reproducing animals. During meiosis, the haploid number is formed. Two gametes join during fertilisation to form a zygote, a single cell with a diploid set of chromosomes. Polyploidy is another term for polyploidy.

Somatic cells divide and multiply during the process of mitosis. The chromosomes uncoil between cell divisions, resulting in chromatin, a scattered mass of genetic material. DNA synthesis can begin when the chromosomes uncoil. During this phase, DNA repeats itself in preparation for cell division. After replication, the DNA condenses into chromosomes. At this point, each chromosome is made up of a cluster of duplicate chromatids held together by the centromere. The kinetochore, a protein structure that helps to joins the spindle fibres, attaches to the centromere (part of a structure that influences and pulls the chromatids to opposite ends of the cell). During the middle stage of cell division, the centromere replicates and the chromatid pair separates; each chromatid becomes a separate chromosome at this time.

The cell divides into two daughter cells, each with a complete set of chromosomes (diploid). The chromosomes uncoil in the new cells, regenerating a widespread network of chromatin. In many organisms with separate sexes, there are two types of chromosomes: sex chromosomes and autosomes. Except for sex-related traits, which are controlled by sex chromosomes, autosomes are in charge of all attribute inheritance. Human's cell is observed to have 22 pairs of autosomes and one pair of sex chromosomes. They all behave in the same way during cell division. Information about sex-related traits can be found in the linking group.

Chromosome breaking is the physical separation of chromosomal components. It is usually followed by a gathering (frequently at a foreign site, resulting in a chromosome unlike the original). The traditional hypothesis of crossing over is based on the breakage and reunion of homologous chromosomes during meiosis, which results in unexpected types of offspring following a mating.

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