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## Nucleic Acids and Amino Acids

Harriet S. Meyer

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Standards for molecular nomenclature are set jointly by the International Union of Biochemistry and Molecular Biology (IUBMB) and the International Union of Pure and Applied Chemistry (IUPAC). The recommendations in this section are based on conventions put forth by the IUBMB-IUPAC Joint Commission on Biochemical Nomenclature and the Nomenclature Committee of the IUBMB., The nucleic acids DNA and RNA are nucleotide polymers. Deoxyribonucleic acid, or DNA, is the embodiment of the genetic code and is contained in the chromosomes of higher organisms. It is made up of (1) molecules called bases, (2) the sugar 2-deoxyribose, and (3) phosphate groups. The

## Human Gene Nomenclature

Harriet S. Meyer

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The International System for Human Gene Nomenclature (ISGN) was inaugurated in 1979, and has been continually updated. The Human Gene Mapping Nomenclature Committee, which developed the ISGN, put forth a “one human genome one gene language” principle: Certainly there exists a genetic and molecular basis for a single human gene language without dialects. All human nuclear genes as we know them follow the same genetic, molecular, and evolutionary principles…. Thus it is reasonable and logical to develop a standard and consolidated gene nomenclature system rather than have a human gene language based on different gene systems.(p12) The committee, known as

## Oncogenes and Tumor Suppressor Genes

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date: 17 January 2017

Cancer is caused by an accumulation of genetic alterations that confer a survival advantage to the neoplastic cell. J. L. Jameson(p73) Oncogenes are “[g]enes that normally play a role in growth but, when overexpressed or mutated, can foster the growth of cancer.” Oncogenes were discovered and characterized in viruses and animal experimental systems. These genes exist widely outside the systems in which they were discovered, and their normal cellular homologues are important in cell division and differentiation. Human oncogenes should be expressed according to style for human gene symbols (see , Human Gene Nomenclature). Mouse oncogenes (and other nonhuman oncogenes) should

## Human Chromosomes

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Chromosomes are dark-staining, threadlike structures in the cell nucleus composed of DNA and chromatin that carry genetic information (definition after Nussbaum et al and Mueller and Young). Formalized standard nomenclature for human chromosomes dates from 1960 and, since 1978, has been known as the International System for Human Cytogenetic Nomenclature (ISCN). Material in this section is based on recommendations in ISCN 2005. Earlier reports have also been consulted. Human chromosomes are numbered from largest to smallest from 1 to 22. There are 2 additional chromosomes, X and Y. The numbered chromosomes are known as autosomes, X and Y as the

## Nonhuman Genetic Terms

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[T]he word mouse … comes originally from the Sanskrit mush derived from a verb meaning to steal. … Mice and rats, through their voracious activities in grain larders and as carriers of disease, inflicted considerable losses in food and lives upon ancient civilizations.

H. C. Morse III(p6) A very obvious gap in our understanding of human genome evolution lies in the complete absence of any mapping data from the eutherian orders most dis- tantly related to man, particularly the edentates. We would urge anyone with an interest in the genetics of the aardvark and the armadillo to consider a unique mapping

## Pedigrees

Harriet S. Meyer

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Pedigree format recommendations are put forth by the Pedigree Standardization Task Force of the National Society of Genetic Counselors. (See also , Legal and Ethical Considerations, Protecting Research Participants' and Patients' Rights in Scientific Publication, Rights in Published Reports of Genetic Studies.) A square represents a male individual; a circle, a female individual; and a diamond, an individual whose sex is unknown: Shading indicates an affected individual. Partitions with different shading should be used for individuals with more than one condition. Define all shading in a legend or key. Multiple individuals are indicated by a number inside the shape. For

## Genetics

Harriet S. Meyer

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When new nomenclature is presented, it often looks odd to practising biochemists and is not always ap- preciated. Even systems such as the one-letter codes for amino acids, which have been universally adopted, met with some skepticism at first. R. Cammack Every cell division involves the copying of 6 billion base pairs (bp) of DNA. F. S. Collins and J. M. Trent | Standards for molecular nomenclature are set jointly by the International Union of Biochemistry and Molecular Biology (IUBMB) and the International Union of Pure and Applied Chemistry (IUPAC). The recommendations in this section are based on conventions put forth by


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