'Ome Sweet 'Omics--
A Genealogical Treasury of Words

By Joshua Lederberg and Alexa T. McCray

“So intricate and inscrutable a mystery is the origin of language that in 1866 the French Society of Linguistics formally banned further research on the subject.”


Genomics and Proteomics are the buzzwords of the dawning millennium. There is no counting of www.-ics.com and www.-ix.com sites to be found on the Web. That most of these terms, old and new, have been contrived as slogans to attract attention, does not diminish their likely substance, and they are embedded in the advancing edge of science and technology. Defying the French Linguists' caveat, we may yet ask, where do terms such as genome and genomics come from? What do the suffixes -ome and -omics, so abundant in today's vocabulary, signify?

The Oxford English Dictionary (OED) attributes genome to Hans Winkler, 1920; the full reference is his book Verbreitung und Ursache der Parthenogenesis im Pflanzen- und Tierreiche, (Verlag Fischer, Jena). At page 165, he writes (in rough translation): "I propose the expression Genom for the haploid chromosome set, which, together with the pertinent protoplasm, specifies the material foundations of the species ...." He discusses this in the context of hybrids that may comprise distinctive genomes from the respective parents, and are then heterogenomatisch. The term was used sporadically in the 1920s and 1930s--Theodosius Dobzhansky scorned it; he would have preferred a "non-committal expression like 'set of chromosomes.'" (1937--Genetics and the Origin of Species)

The OED also offers an etymology, that Winkler's Genom is an irregular formation from gen + some--from chromosome--and this is recopied in many other sources. OED scholarship can rarely be contested, but it has to be challenged here: the story is more interesting, though it must be conjectural for want of specific documentary evidence from Winkler or his contemporaries. As a botanist, Winkler must have been familiar with a host of -ome words like biome, rhizome, phyllome, thallome, tracheome--all of which predated 1920. They share in common, the concept of -ome signifying the collectivity of the units in the stem. Thus rhizome is the entire root system, or modifications thereof. Any zoologist would have known coelome, or system of cavities. Hence, genome would be understood to be the collectivity--dare we say the genre--of the genes.

Genomics was introduced 24 years ago by Victor McKusick and Frank Ruddle, as the catchword for the new journal of that name they had just founded. It has the same narrower connotation today, of emphasis on linear gene mapping and DNA sequencing. Hence we also see flanking extensions like functional genomics and structural genomics, to widen the horizon of genomic studies to what resembles the overall medley of genetics of yesteryear, albeit with all the power of high technology.

Our favorite sources on scientific terminology include Roland W. Brown's Composition of Scientific Words, 1954 (but often reprinted), and W.E. Flood's Scientific Words, 1961. Brown offers: "-ome: < Gr, -oma, signifying condition, having the nature of." Brown also remarks how "words, when they make their debut in scientific or literary society ... should be simple, euphonious, pure and mnemonically attractive." Genome does qualify on all counts.

Flood says: "-ma Gk. ... produces a noun often expressing the result of a verbal action ...." Thus drama, panorama, plasma, edema, cinema. He also cautions that starting from sarcoma, the medical profession has co-opted the -oma suffix to signify an overgrowth or neoplasm of any specified tissue.
Finally, a Sanskrit-speaking friend offers that "-OM signifies fullness, completeness as in divinity ..., it encompasses the entire universe in its unlimitedness." Ωµ, with its endless intonation, is then redolent with the Ω, the greatest and the very last character in the Greek alphabet. What could resonate more with today's -ome terms!

In physics, probably starting with Faraday's ion, cation, anion, the -on suffix has tended to signify an elementary particle, later materially focused on the photon, electron, proton, meson, etc., whereas -ome in biology has the opposite intellectual function, of directing attention to a holistic abstraction, an eventual goal, of which only a few parts may be initially at hand. The accompanying table illustrates a number of prevailing examples. It includes Lederberg's own recent coinage of microbiome, to signify the ecological community of commensal, symbiotic, and pathogenic microorganisms that literally share our body space and have been all but ignored as determinants of health and disease.

The very neolexical process evokes some provocative analogies: our individual minds interact to constitute human culture, which we can relabel as the noöome, to take a leaf from Teilhard de Chardin.

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| antigenome | immunogenome | plastidome |
| bacteriome | immunome | plerome |
| basidiome | haptenome | proteome |
| biome | karyome | psychome |
| cardiome | leptome | regulome |
| caulome | microbiome | rhabdome |
| chondriome | mnemome | rhizome |
| cladome | mycetome | stereome |
| coelome | neurome | thallome |
| epigenome | odontome | tracheome |
| erythrome | osteome | transcriptome |
| genome | pharmacogenome | trichome |
| geome | phenome | vacuome |
| hadrome | phylome | | histome | physiome |

Listed above we present a lexicome of terms, suffixed by -ome, extracted from the MEDLINE database, the OED, and the Web of Science. Our aim was to select terms using the -ome suffix in the sense of this article. For the most part this excludes the suffixes -tome, -stome, -some, -drome. Some terms are best known as the -omics derivative. Today, we should assume that further derivations are no longer from Greek or Sanskrit, that the -ome idea is borrowed from the multitude of terms already ensconced into English or the scientific lingua franca. Most of these terms are already in print; almost all should be self-revealing: a few are conjectural. Guess which of these -omes were made up only just now; even for these, there may well be an -omics.com to match.

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