Public Lecture by Dr. Ajit P.Varki Department of Medicine
"Humans, Apes, and the Spread of Cancer"
Wednesday, March 19, 2003 at 6:00 p.m. in the Garren Auditorium, Basic Science Building
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Viewed from the time scales of the Universe and of the origins of life on earth, we humans are just a very recent and minor novelty. Viewed from a molecular perspective we are also not obviously unusual, being highly similar to the great apes, our closest evolutionary relatives (e.g., protein sequences of humans and apes are 97-100% identical). However, when viewed from our "anthropocentric" perspective as humans we are a most unusual species which has had a dramatic effect on the earth. The evolution of humans from a common ancestor with the chimpanzee evidently involved many steps, that were influenced by interactions amongst factors of genetic, developmental, ecological, microbial, climatic, behavioral, cultural and social origin. The genetic factors can be explored by direct comparisons of human and great ape genomes, genes and gene products, and by explicating the biochemical and biological consequences of any differences found. In this regard, we have discovered multiple genetic and biochemical differences between humans and great apes, particularly with respect to a family of cell surface molecules called sialic acids, as well as in the metabolism of thyroid hormones. The hormonal differences have potential consequences for human brain development. The differences in sialic acid biology have several implications for the human condition, ranging from susceptibility or resistance to microbial pathogens, effects on endogenous receptors within the immune system, potential effects on placental biology, the expression of oncofetal antigens in cancers, the consequences of dietary intake of animal foods, and possibly on the development of the mammalian brain. These studies will be discussed in the light of broader emerging knowledge regarding the human and chimpanzee genomes.