Dr. Robert J. Lefkowitz

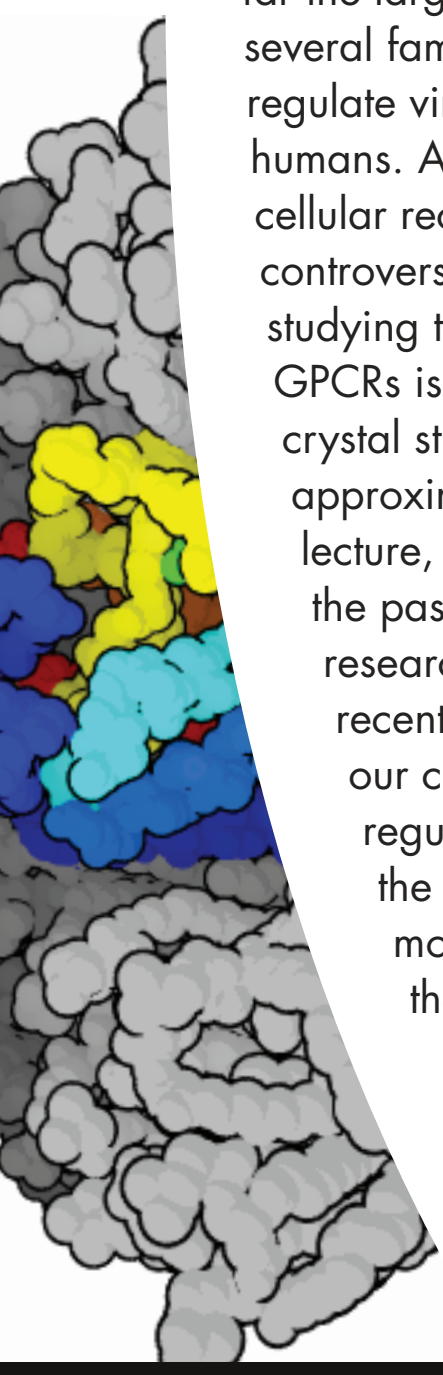
Seven Transmembrane Receptors

Howard Hughes Medical Institute Lecture

For Undergraduates

Thursday
4–5 pm, 76-156
Koch Auditorium

March 13th 2014



Seven transmembrane receptors (7TMRs), also known as G protein coupled receptors (GPCRs) represent by far the largest, most versatile, and most ubiquitous of the several families of plasma membrane receptors. They regulate virtually all known physiological processes in humans. As recently as 40 years ago, the very existence of cellular receptors for drugs and hormones was highly controversial, and there was essentially no direct means of studying these putative molecules. Today, the family of GPCRs is known to number approximately 1,000, and crystal structures have recently been solved of approximately a dozen members of the family. In my lecture, I will briefly review how the field evolved over the past 40 years, hanging some of the story on my own research throughout this period. Then I will discuss recent developments in the field, which are changing our concepts of how the receptors function and are regulated in fundamental ways. Finally, I will discuss the possibility of leveraging this new mechanistic and molecular information to develop new classes of therapeutic agents.

Reception to Follow. Open to undergraduates. Others welcome.

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Robert J. Lefkowitz, MD is James B. Duke Professor of Medicine and Professor of Biochemistry at the Duke University Medical Center. He has been an Investigator of the Howard Hughes Medical Institute since 1976. His group spent 15 years developing techniques for radioligand binding, solubilization, purification, and reconstitution of the four adrenergic receptors known at the time. In 1986, Dr. Lefkowitz transformed the understanding of what had become known as G protein coupled receptors (GPCRs), when he and his colleagues cloned the gene and cDNA for the β2 adrenergic receptor, and recognized its sequence homology with rhodopsin, thus establishing them as the first members of a new family of proteins, the Seven Transmembrane Receptors (7TMRs). This superfamily is now known to be the largest, most diverse, and most therapeutically assessable. Since then, Dr. Lefkowitz has continued to revolutionize the GPCR field through the cloning of eight adrenergic receptor subtypes and the first serotonin (5HT1A) receptor; discovery and cloning of the G protein coupled receptor kinases (GRKs) and β-arrestins; and discovery of "biased" signaling through β-arrestins or G proteins. He has received numerous awards and honors, including the National Medal of Science, the Shaw Prize, the Albany Prize, and the 2012 Nobel Prize in Chemistry. He was elected to the USA National Academy of Sciences in 1988.