

Har Gobind Khorana

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- Har Gobind Khorana was a world renowned biochemist famous for his work in the field of genetics and DNA.
- He was the **first person to demonstrate the role of nucleotides in protein synthesis.**
- H. G. Khorana was born in Punjab (now part of eastern Pakistan) in January, 1922.
- He studied at the Punjab University in Lahore where he obtained an M. Sc. degree.
- In **1945 he was awarded a scholarship by the Government of India** to study at the University of Liverpool.
- He went to England where he worked for a Ph.D degree at the University of Liverpool under the supervision of Roger J.S. Beer.
- He earned his **Ph.D in 1948.**
- **By 1949, he obtained a fellowship to work with Dr. G. W. Kenner and Professor A. R. Todd where his interest in both proteins and nucleic acids took root.**
- In **1952**, he got a **job offer from Dr. Gordon M. Shrum of British Columbia** and he went to Vancouver.
- With Dr. Shrum's inspiration, encouragement and scientific counsel from Dr. Jack Campbell of the University of British Columbia, **Khurana in a group began to work in the field of biologically interesting phosphate esters and nucleic acids.**
- In 1960, he moved to the Institute for Enzyme Research at the University of Wisconsin and then became a naturalized citizen of the United States.
- He became the **Professor of Biology and Chemistry at the Massachusetts Institute of Technology (MIT)** in 1970 and remained there until his retirement in 2007.

His works: During the 1960s he delved deeper into his experiments in nucleic acids found in **RNA, a chemical that**

translates the genetic information contained in DNA. RNA is composed of **four chemical bases** represented by the letters A, C, U, and G.

Using chemical synthesis to combine the chemical bases, Khorana deduced that the code for amino acid serine was UCU and that for leucine was CUC. **He showed that the genetic code consists of 64 distinct three-letter words.**

Biochemist Marshall W. Nirenberg had independently been working on genetics and Khorana confirmed the former's findings that **four different types of nucleotides are arranged on the spiral staircase of the DNA molecule.**

He proved that the nucleotide code is transmitted in groups of three, called **codons** to the cells. Some codons are **responsible for signaling to the cells to start or stop the manufacture of proteins.**

He was successful in **constructing the first ever artificial gene in 1972.** A few years later he made the artificial gene function in a bacteria cell.

During his later years he experimented on the molecular mechanisms underlying the cell signaling pathways of vision in vertebrates. He primarily studied the structure and function of **Rhodopsin, a light sensitive protein found in the eye.**

Honours:

- He won the **Nobel Prize in Physiology or Medicine in 1968** "*for the interpretation of the genetic code and its function in protein synthesis*".
- He **shared the Prize with Marshall W. Nirenberg and Robert W. Holley** for research that showed how the **order of nucleotides in nucleic acids which carry the genetic code of the cell, control the cell's synthesis of proteins.**
- Khorana and Nirenberg were also awarded the **Louisa Gross**

Horwitz Prize from Columbia University in the same year.

- The **Khorana Program was founded in his honor in 2007** by the University of Wisconsin-Madison, the Government of India, and the Indo-US Science and Technology Forum, with the mission to build a community of scientists, industrialists, and social entrepreneurs in the US and India.