Interstellar dust clouds may have sown seeds of life on Earth

From our ANI Correspondent

Washington, Aug 23: Oxygen, carbon and water are some of the widely known elements necessary for supporting life on Earth. Adenine, an essential organic molecule, without which the basic building blocks of life would not come together, is equally important.

But till now, scientists have not been able to find the origin of Earth's adenine and where else it might exist in the solar system.

Now, a University of Missouri-Columbia researcher has used a theoretical model to hypothesize the existence of adenine in interstellar dust clouds.

"The idea that certain molecules came from space is not outrageous. You can find large molecules in meteorites, including adenine. We know that adenine can be made elsewhere in the solar system, so why should one consider it impossible to make the building blocks somewhere in interstellar dust?" said Rainer Glaser, professor of chemistry in MU's College of Arts and Science.

According to Prof. Glaser, these same interstellar clouds may have showered young Earth with adenine as it began cooling billions of years ago.

They could also potentially hold the key for initiating a similar process on another planet, he said.

Prof. Glaser said astronomers should look for interstellar dust clouds that have highly-concentrated hydrogen cyanide (HCN), which can indicate the presence of adenine.

Finding such pockets would narrow the spectrum of where life could exist within the Milky Way galaxy, he said.

"There is a lot of sky with a few areas that have dust clouds. In those dust clouds, a few of them have HCN. A few of those have enough HCN to support the synthesis of the molecules of life. Now, we have to look for the HCN concentrations, and that's where you want to look for adenine," said Prof. Glaser.

"Chemistry in space and 'normal chemistry' can be very different because the concentrations and energy-exchange processes are different. These features make the study of chemistry in space very exciting and academically challenging; one really must think without prejudice," he said.

The theory describing the fusion of early life-forming chemicals is presented in the latest issue of the peer-reviewed journal "Astrobiology".

The paper, "Adenine Synthesis in Interstellar Space: Mechanisms of Prebiotic Pyrimidine-Ring Formation of Monocyclic HCN-Pentamers," is co-authored by Brian Hodgen (Creighton University), Dean Farrelly (University of Manchester) and Elliot McKee (St. Louis University).