Clues to our birth may be written in space

January 22 2005

Extraterrestrial molecules found in meteorites may hold the key to the origin of life on Earth, according to chemistry research at the University of Leeds.
Dr Terence Kee and a team from Leeds and Bradford universities are examining a particular source of phosphorus found naturally only in space to discover whether it could have helped form the building blocks of life.

Phosphorus is found in all living cells, but some scientists doubt that the most common form of phosphorus – phosphate – helped form life on earth due to its insolubility in water. Dr Kee believes the earliest forms of DNA/RNA could have been built from other phosphorus-containing molecules called phosphonates, because they are water-soluble and more reactive.

However, these phosphonates are only found on Earth as biological products – for example, in the metabolism of certain marine creatures.

The project was inspired by a 1992 account identifying phosphonates in a meteorite which crashed on earth, confirming that these had been created in interstellar space. “I’ve always had an interest in phosphonates but before reading work on the Murchison meteorite, I’d never considered they might have a role to play in the origins of life on Earth,” said Dr Kee.

These exotic molecules now form the basis of the PHOSMETIC project, refereed by the Nobel Laureate Sir Harry Kroto. The team will

reproduce these phosphonates under 'extra-terrestrial' conditions in a laboratory. Important molecules called phosphaalkynes – present in interstellar gas clouds and structurally similar to phosphonates – will be used. They will be irradiated with UV light in the presence of water, simulating the conditions found in space. Dr Kee aims to provide the first direct chemical link between phosphorus compounds found within interstellar gas clouds and those incorporated within solar system meteorites and ice grains: "I see the PHOSMETIC project as addressing one of several major problems in origin-of-life studies in which phosphorus, and phosphonates in particular, could play a major role."