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Enantiomer Excesses in Carbonaceous Meteorites

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Introduction: Carbonaceous meteorites are among the oldest objects in the solar system. They provide evidence of organic compounds that were present in the Solar System before the origin of life. Amino acids, purines, pyrimidines and short monocarboxylic acids are some of the classes of prebiotically relevant compounds that have been detected in a variety of carbonaceous meteorites. While the majority of indigenous meteoritic compounds are racemic, i.e., their D/L enantiomer ratios are 50:50 some of the more unusual amino acids contain slightly more of one enantiomer - usually the L. In addition, initial analyses of some meteoritic sugar derivatives (sugar acids) revealed significant enantiomer excesses of the D enantiomers. A question of relevance from such studies is: did extraterrestrial sources aid in the beginning of life's homochirality? This presentation will include updated results of recent analyses of enantiomer ratios of meteoritic compounds as well attempts at laboratory re-creation of such excesses. If the forces that acted on organic compounds (and/or their precursors) in the early Solar System are common, then specific laboratory experiments may indicate whether enantiomer excesses in organic compounds are available for the origin of life in a multitude of planetary systems.