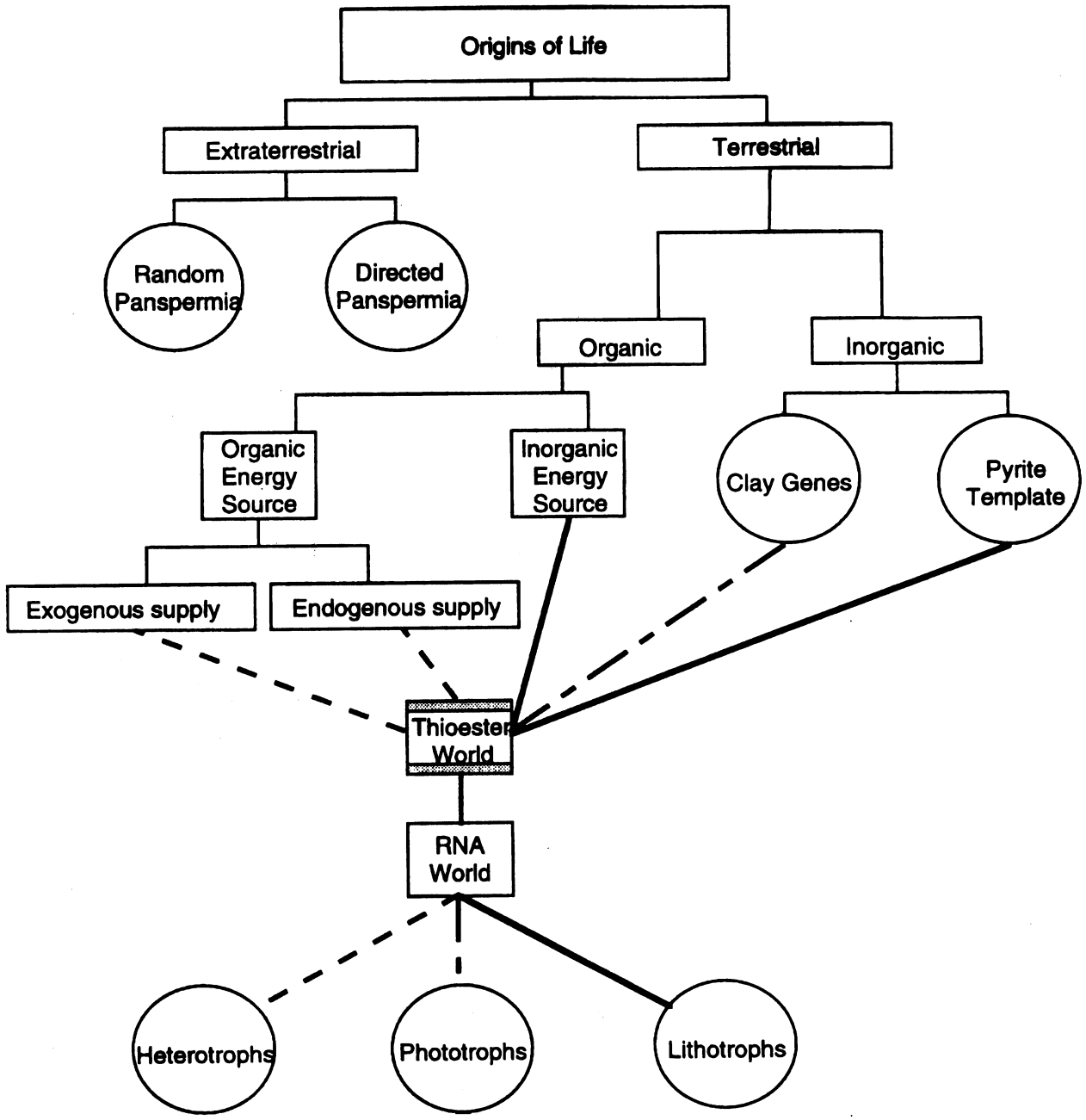

Figure 10.6 Relationships among various theoretical or conceptual models for the origins of life.[77] Dashed and solid lines at the bottom of the figure connect mechanisms with putative metabolic type of first organisms. The thioester world is proposed as an intermediate leading to an RNA world

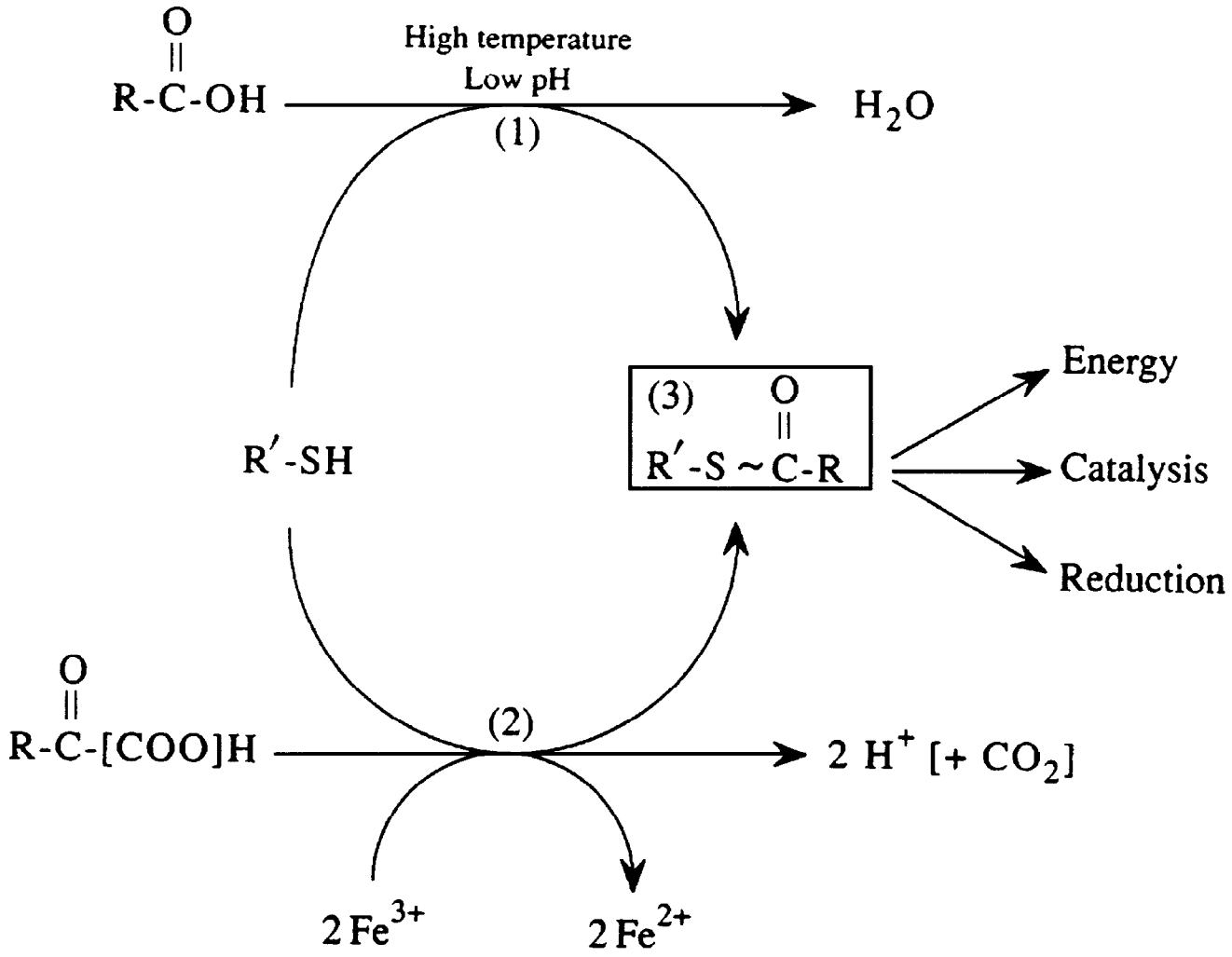

Figure 10.12 Mechanisms for synthesis of thioesters. (1) High temperature, low pH spontaneous synthesis from thiols and organic acids; (2) oxidative synthesis from thiols and α-keto organic acids based on ferric iron reduction[29]

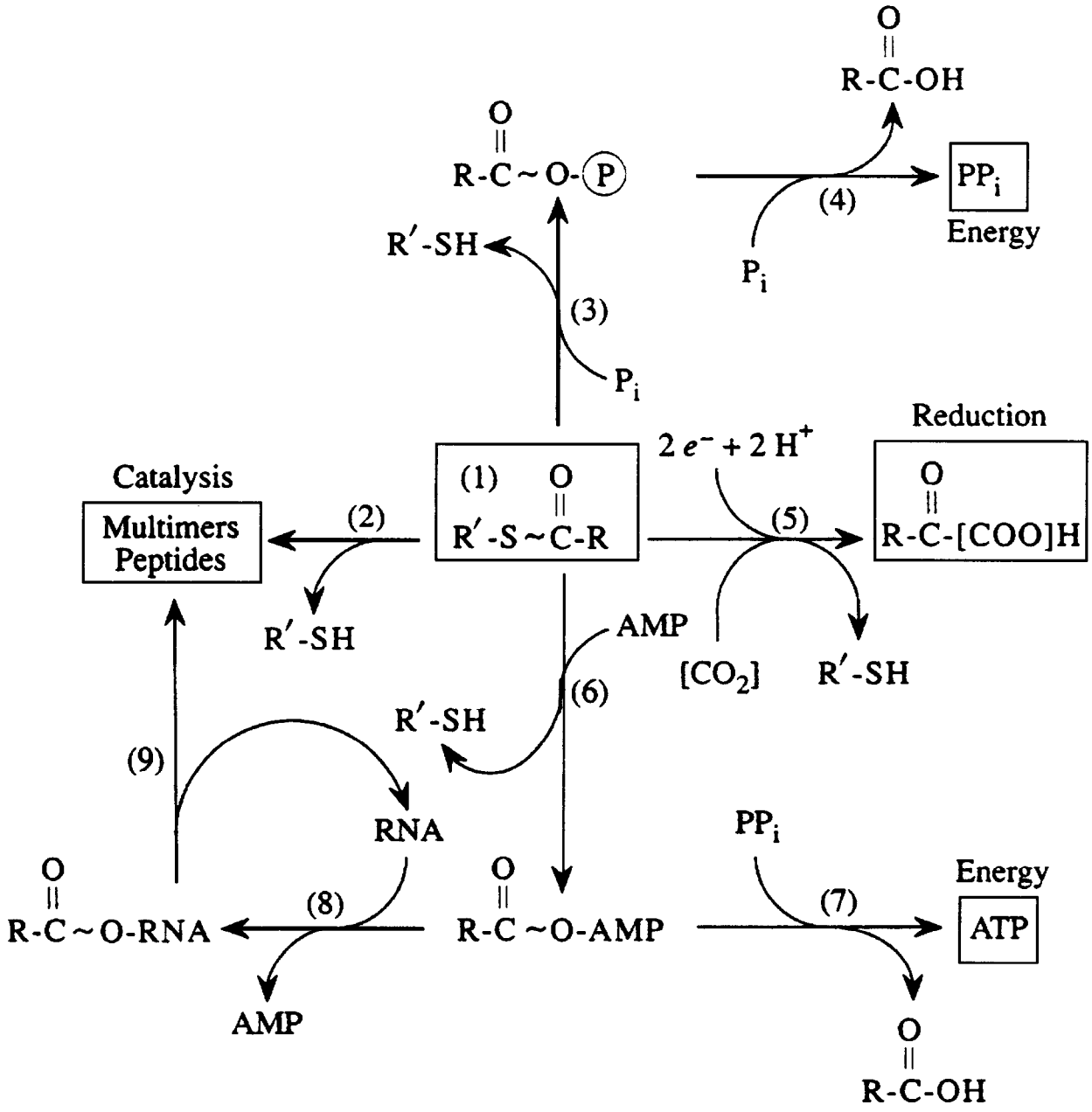

Figure 10.10 Synopsis of chemical transformations in the thioester world illustrating: (1) a pool of thioesters; (2) polymerisation of protoenzymes; (3) generation of high-energy phosphate esters; (4) generation of pyrophosphate, a primordial energy carrier; (5) thioester-based organic synthesis reactions; (6) formation of high-energy adenylate derivatives; (7) production of ATP; (8) generation of acyl-RNA complexes (e.g. amino-charged tRNA); (9) peptide formation[29]