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### **Can an imidazole be formed from an Alanyl-Seryl-Glycine tripeptide under possible prebiotic conditions?**

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The five-membered heterocyclic imidazole group, which is an essential component of purines, histidine and many cofactors, has been abiotically synthesized in different model experiments that attempt to simulate the prebiotic environment. The evolutionary significance of imidazoles is highlighted not only by its presence in nucleic acid components and in histidine, but also by experimental reports of its ability to restore the catalytic activity of ribozymes. However, as of today there are no reports of histidine in carbonaceous chondrites, and although the abiotic synthesis of His reported by Shen et al. [1], [2], proceeds via an Amadori rearrangement, like in the biosynthesis of histidine, neither the reactants nor the conditions are truly prebiotic. Based on the autocatalytic biosynthesis of 4-methylidene-imidazole-one (MIO), a cofactor of some members of the amino acid aromatic ammonia-lyases and aminomutases, which occur via the self-condensation of a simple Ala-Ser-Gly motif within the sequence of the enzymes, we propose a possible prebiotic synthesis of an imidazolide.

[1] Shen C et al. (1987) *Origins of Life* 17:295–305. [2] Shen C, et al. (1990) *Journal fo Molecular Evolution* 31:167–174