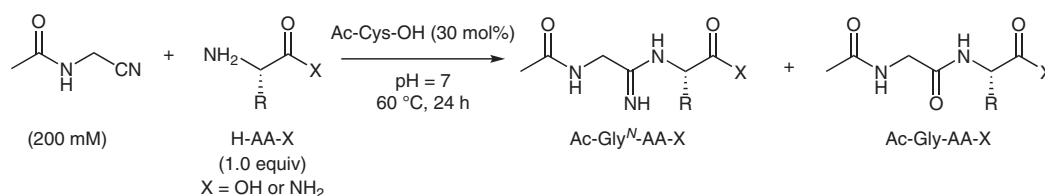


C. S. FODEN, S. ISLAM, C. FERNÁNDEZ-GARCÍA, L. MAUGERI, T. D. SHEPPARD, M. W. POWNER* (UNIVERSITY COLLEGE LONDON, UK)

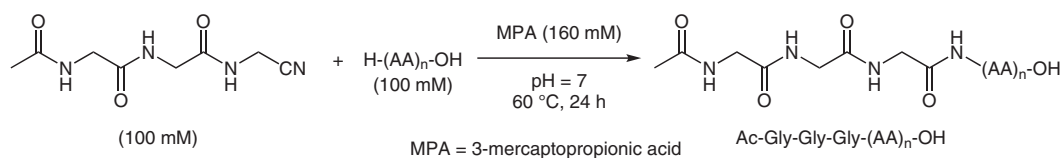
Prebiotic Synthesis of Cysteine Peptides that Catalyze Peptide Ligation in Neutral Water

Science **2020**, *370*, 865–869, DOI: 10.1126/science.abd5680.

Cysteine-Catalyzed Peptide Synthesis in Neutral Water



H-AA-X	Ac-Gly ^N -AA-X yield/%	Ac-Gly-AA-X yield/%	H-AA-X	Ac-Gly ^N -AA-X yield/%	Ac-Gly-AA-X yield/%
H-Asp-OH	58	-	H-Gly-NH ₂	21	52
H-Gln-OH	56	-	H-Arg-NH ₂	14	56
H-Glu-OH	58	-	H-Asp-NH ₂	6	58
H-His-OH	73	-	H-Glu-NH ₂	-	64
H-Ile-OH	55	-	H-His-NH ₂	-	67
H-Leu-OH	53	-	H-Ile-NH ₂	12	47
H-Pro-OH	58	-	H-Met-NH ₂	5	62
H-Trp-OH	32	5	H-Tyr-NH ₂	3	62



Ac-Gly-Gly-Gly-Met-Gly-OH 80% yield	Ac-Gly-Gly-Gly-Ala-Ala-Ala-OH 90% yield	Ac-Gly-Gly-Gly-Ala-Gly-Ala-OH 84% yield
Ac-Gly-Gly-Gly-Gly-Gly-OH 89% yield	Ac-Gly-Gly-Gly-Gly-Gly-His-OH 89% yield	Ac-Gly-Gly-Gly-Met-Ala-Ser-OH 77% yield

Significance: Cysteine is very attractive due to its high reactivity as a nucleophile. The authors found that acylated cysteine can be synthesized in a prebiotic approach and used as a catalyst in the catalytic peptide ligation pathway to prepare oligopeptides.

Comment: With the cysteine as a catalyst, various dipeptides can be synthesized in neutral water. When 3-mercaptopropionic acid was used instead of cysteine, oligopeptides could also be prepared in a similar thiol-catalyzed peptide-ligation manner. The yields of the target peptides are moderate to good.

SYNFACTS Contributors: Hisashi Yamamoto, An Wu
Synfacts 2021, 17(02), 0225 Published online: 20.01.2021
DOI: 10.1055/s-0040-1706109; Reg-No.: H15820SF

© 2021, Thieme. All rights reserved.
Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

Category

Peptide Chemistry

Key words

cysteine peptides

catalytic peptide ligation

aqueous media

Synfact
of the
Month

This document was downloaded for personal use only. Unauthorized distribution is strictly prohibited.