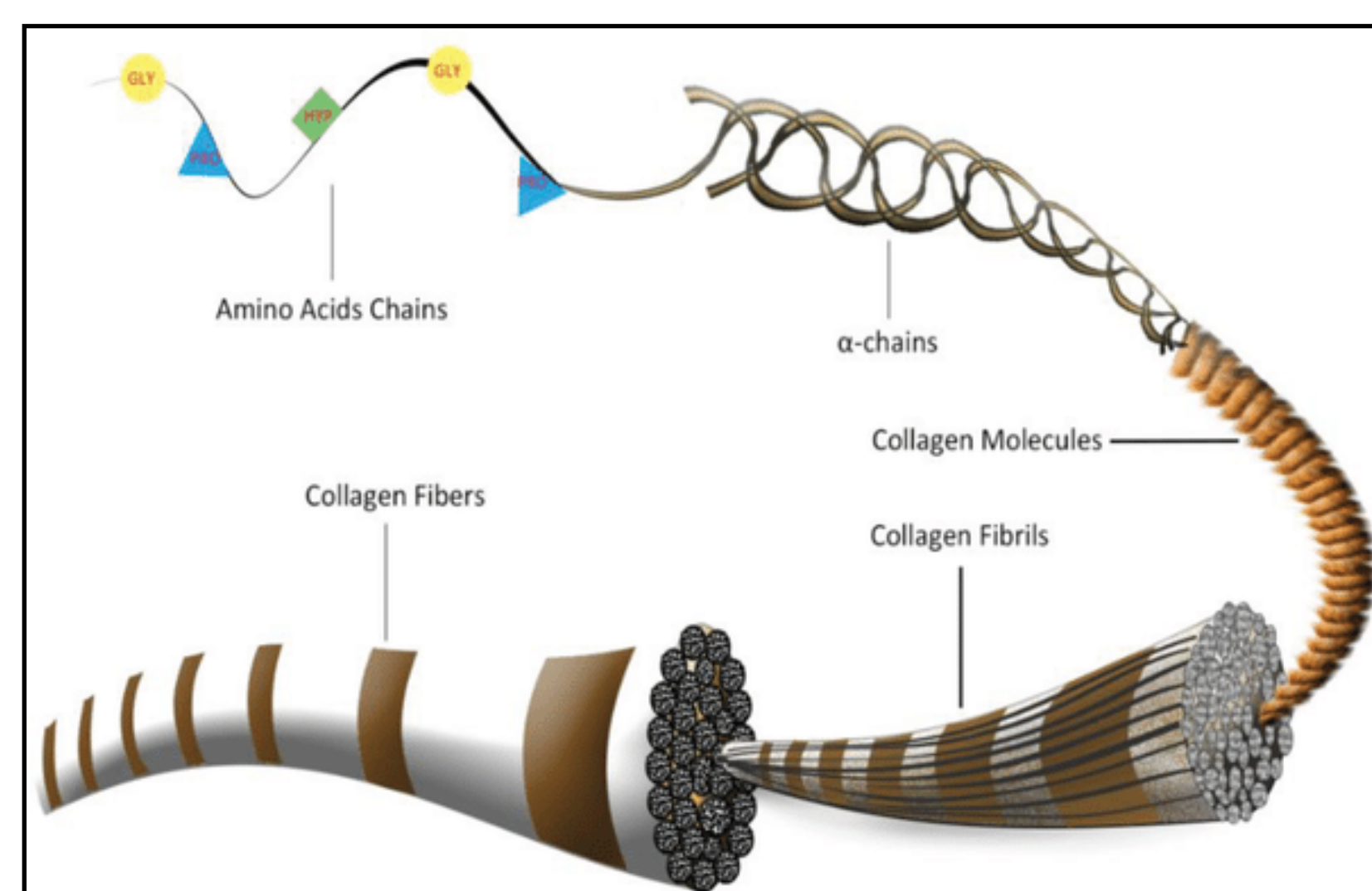


Introduction

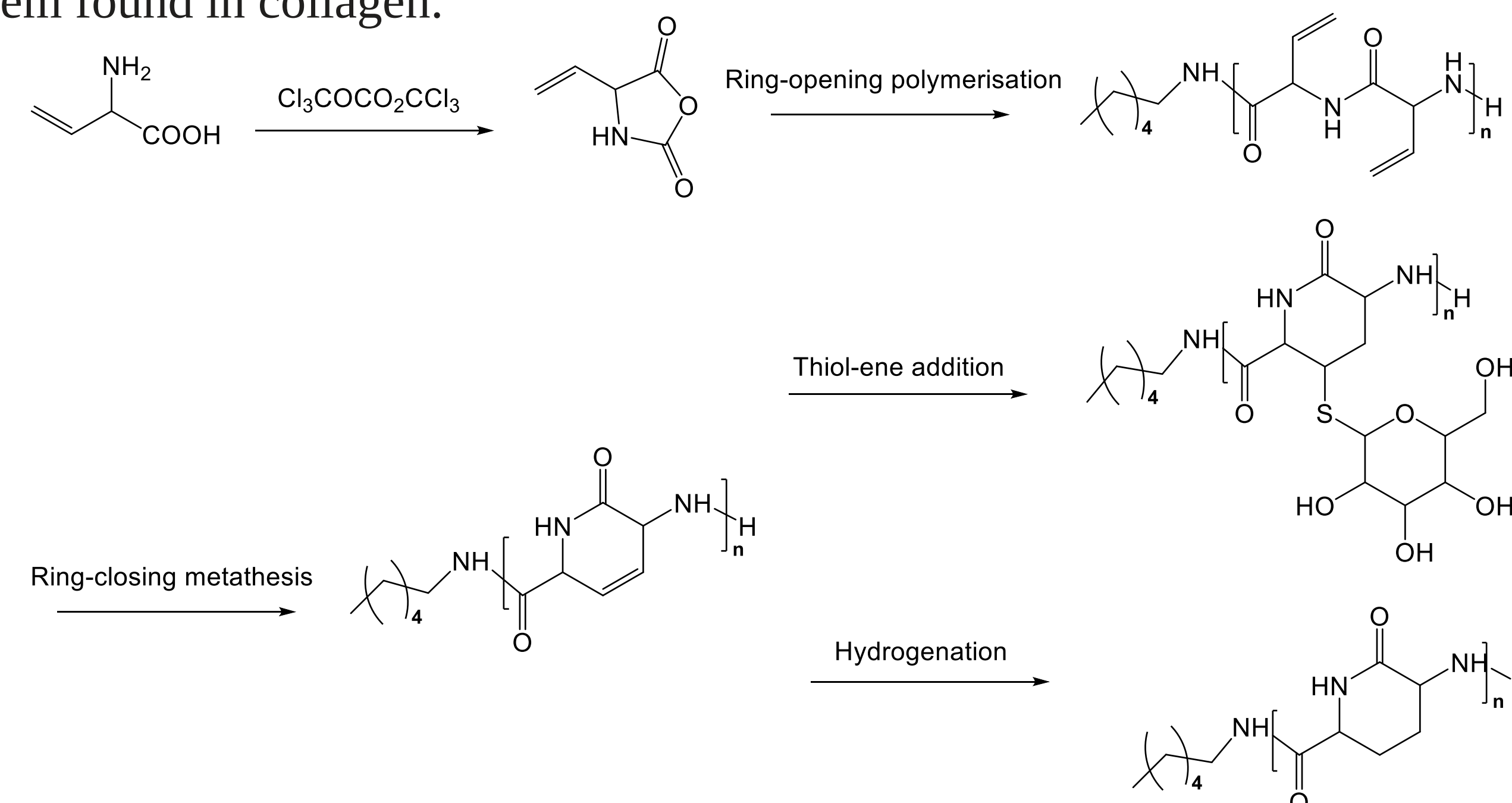
- Polypeptides have gained a large attention because of their biomedical uses in tissue engineering, drug delivery etc.¹
- Some interesting polypeptides are important biomimetic materials such as elastin-like polypeptides, silk-like polypeptides, water-soluble polypeptides and more.²⁻⁵
- Similarly, collagen-like polypeptides offer versatile properties such as biocompatibility, biodegradability, bioactivities, and self-assembling capabilities.³⁻⁶



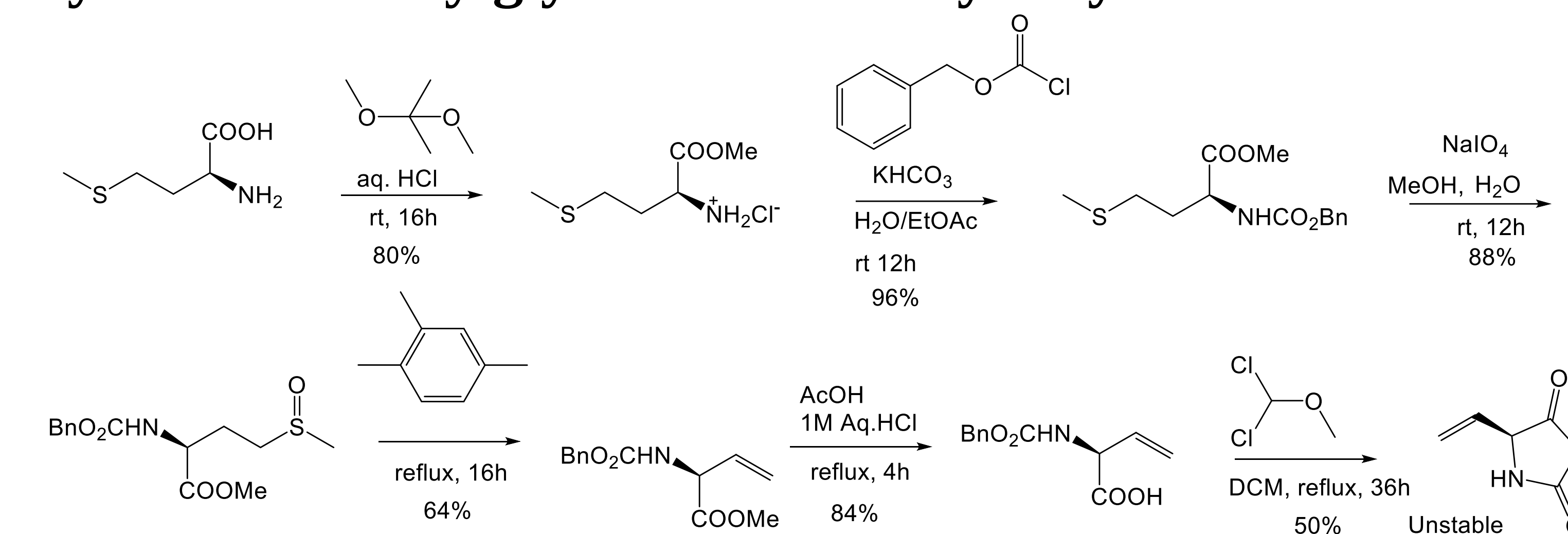
Sketch of the four-level structure of a collagen fiber⁶

Project objectives

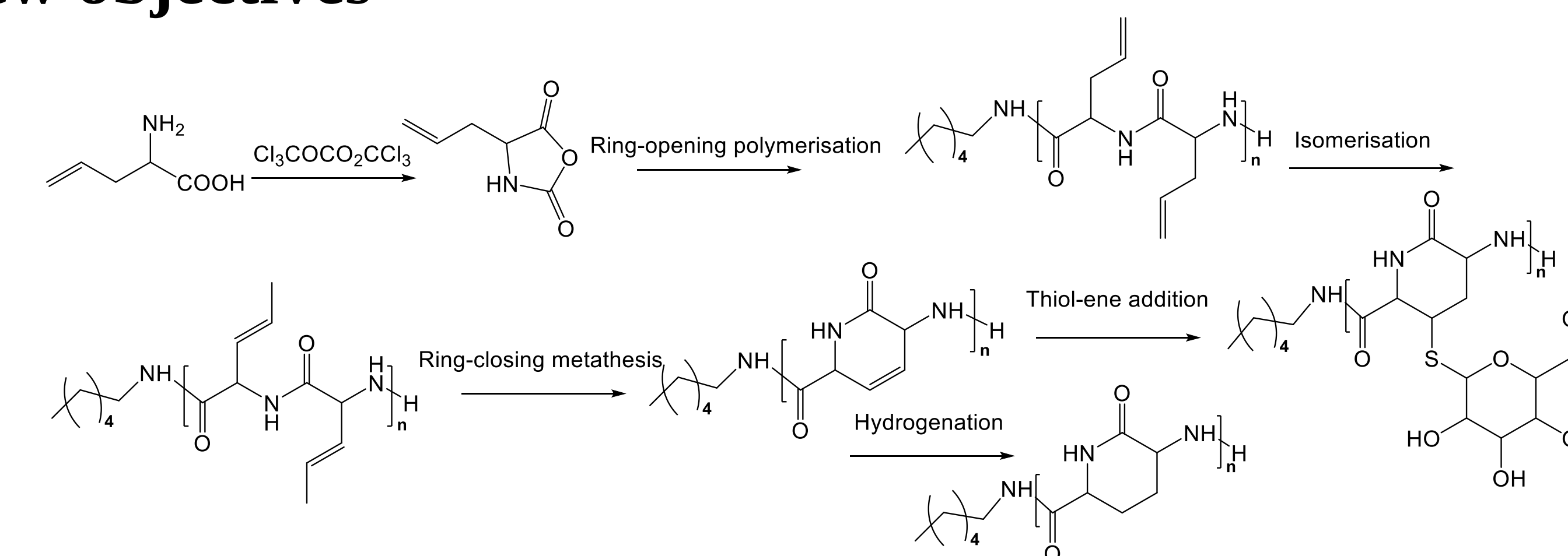
- The goal of this project is to synthesise novel cyclopolypeptides by ring-closing metathesis, which will be functionalised by thiol-ene radical addition.¹ On using 1-thio-β-D-glucopyranose as thiol partner, it will give direct access to glycopolypeptides.⁷
- The resulting hydrogenation product will lead to a collagen mimic, and self-assembly of this will be observed which could lead to a quaternary structure similar to the triple helix system found in collagen.



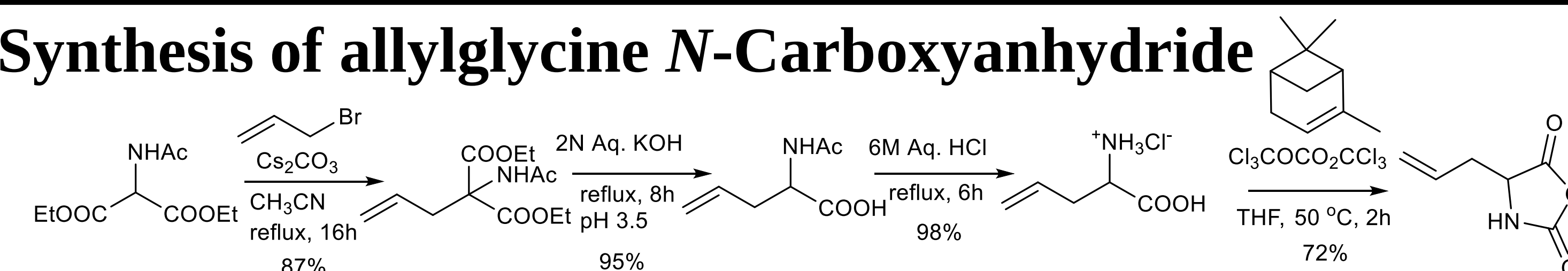
Synthesis of vinylglycine N-Carboxyanhydride



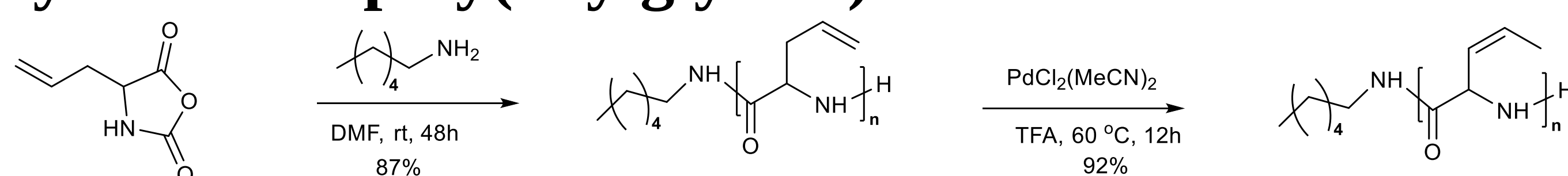
New objectives



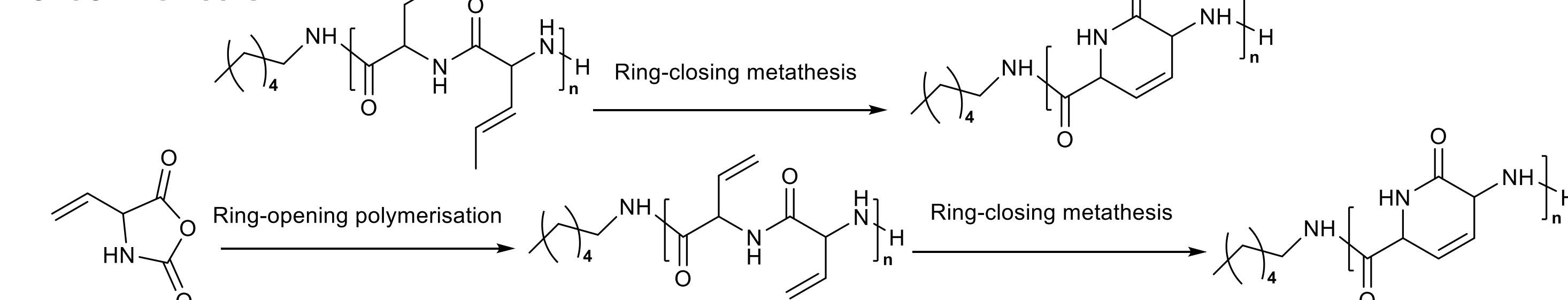
Synthesis of allylglycine N-Carboxyanhydride



Synthesis of poly(allylglycine) and isomerisation



Future work



Conclusions

- Vinylglycine NCA and allylglycine NCA synthesis has been achieved. VGNCA is comparatively unstable whereas AGNCA is stable.
- ROP of AGNCA was performed and poly(AG) was obtained.
- Isomerisation of poly(AG) was successfully achieved to give poly(4-methyl vinylglycine).

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References

- Sun, J.; Schlaad, H., *Macromolecules* **2010**, *43*, 4445-4448.
- Chen, Z.; Zhang, Q.; Li, H.; Wei, Q.; Zhao, X.; Chen, F., *Bioact. Mater.* **2021**, *6*, 589-601.
- Chen, J.; Zou, X., *Bioact. Mater.* **2019**, *4*, 120-131.
- Zhang, Y.; Lu, H.; Lin, Y.; Cheng, J., *Macromolecules* **2011**, *44*, 6641-6644.
- Brodsky, B.; Ramshaw, J. A. M., *Matrix Biol.* **1997**, *15*, 545-554.
- Lin, K.; Zhang, D.; Macedo, M.; Cui, W.; Sarmento, B.; Shen, G., *Adv. Funct. Mater.* **2019**, *29*, 1804943.
- Kramer, J. R.; Deming, T. J., *Biomacromolecules* **2010**, *11*, 3668-3672.
- Kotha, S.; Singh, K., *Tetrahedron Lett.* **2004**, *45*, 9607-9610.
- Gharakhanian, E. G.; Bahrin, E.; Deming, T. J., *J. Am. Chem. Soc.* **2019**, *141*, 14530-14533.
- Lumbroso, A.; Coeffard, V.; Grogne, E. L.; Beaudet, I.; Quintard, J. P., *Tetrahedron Lett.* **2010**, *51*, 3226-3228.
- Rajendra, G.; Miller, M. J., *J. Org. Chem.* **1987**, *52*, 4471-4477.