A direct photocatalytic access to chiral β2-amino acids from alkenes using CO2 as the carbon source

Fact Sheet

Project Information

SYNERGISTIC

Grant agreement ID: 101108702

DOI
10.3030/101108702

Funded under
Marie Skłodowska-Curie Actions (MSCA)

Total cost
€ 0,00

EU contribution
€ 173 847,36

Coordinated by
UNIVERSITAT BAYREUTH
Germany

Start date
1 August 2023

End date
31 July 2025

Objective

The development of enantioselective strategies is becoming highly important as the global chiral chemicals market is expected to reach 120 billion USD by 2025. Among these chiral molecules, β2-amino acids and their derivatives are highly demanding chemicals because of their extensive uses in the synthesis of pharmaceuticals. My SYNERGISTIC proposal will envisage the functionalization of challenging alkenes and CO2 to achieve chiral β2-amino acids under energy-efficient photocatalytic conditions. To achieve this chemistry, I propose a novel approach by employing two different catalysts to activate simultaneously the double bond of alkene and to insert CO2 into the double bond. I will use a metal-free photocatalyst in combination with a halogen atom transfer (XAT) reagent to activate the double bond of alkene, and a
homogeneous chiral transition metal complex to insert the CO2 molecule in a face-selective way. The mild reaction conditions of photoredox catalysis should enable to functionalize a wide range of alkenes as well as for late-stage functionalization of ‘functionally challenging’ molecules found in natural products and complex pharmaceuticals. This proposal will significantly contribute to the advancement of the ‘CO2-valorization’ blueprint as well as will create a groundbreaking ‘green approach’ for the synthesis of chiral β2-amino acids using CO2 as a C1 synthon. More importantly, the fundamental new insights of this novel catalytic system that will be gained during this investigation will be a game-changer for the enhancement of sustainable chemistry.

**Fields of science**

natural sciences > chemical sciences > catalysis > **photocatalysis**

medical and health sciences > basic medicine > pharmacology and pharmacy > **pharmaceutical drugs**

**Keywords**

- Photocatalysis
- CO2 Chemistry
- Chiral Ni-catalysis
- Late-stage Functionalization
- Flow Chemistry

**Programme(s)**

- HORIZON.1.2 - Marie Skłodowska-Curie Actions (MSCA)

**Topic(s)**

- HORIZON-MSCA-2022-PF-01-01 - MSCA Postdoctoral Fellowships 2022

**Call for proposal**

- HORIZON-MSCA-2022-PF-01

See other projects for this call
Funding Scheme

HORIZON-TMA-MSCA-PF-EF - HORIZON TMA MSCA Postdoctoral Fellowships - European Fellowships

Coordinator

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Net EU contribution
€ 173 847,36

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Links
Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Other funding
€ 0,00

Participants (1)

UNIVERSITEIT ANTWERPEN

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Net EU contribution
€ 0,00

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Links
Other funding

€ 0,00

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