

Request Information

Permalink

Conserved RHR Motif Enables Widespread Use Of Non-Canonical Redox Cofactors In Aldehyde Dehydrogenases

Tech ID: 34628 / UC Case 2025-860-0

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .



OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
- » Other
- » **Energy**
- » Bioenergy
- » **Materials & Chemicals**
- » Biological
- » Chemicals
- » Polymers
- » **Research Tools**
- » Other

RELATED CASES

2025-860-0

BRIEF DESCRIPTION

This technology improves enzymatic activity and biomanufacturing cost by engineering a conserved motif into enzymes and utilizing low-cost non-canonical redox cofactors.

FULL DESCRIPTION

Biomanufacturing relies on enzymes and cells to produce fuels, materials, medicines, and foods, however, the enzymes use costly natural redox cofactors (NAD(P)+) with inherent electron delivery issues. This technological invention identifies a conserved sequence motif that enables a class of enzymes to bind and utilize non-canonical redox cofactors (NRC), which are more cost-effective than NAD(P)+. One-third of these enzymes naturally contain this motif, whereas for the remaining two-thirds, introducing the motif enhanced their NRC activity by up to 60-fold, surpassing the performance of nearly all known natural and previously engineered NRC-active enzymes. The motif can be transferred into diverse enzymes to significantly boost their NRC activity, enabling precise enzyme design and modification for superior low-cost biomanufacturing performance.

SUGGESTED USES

- » Cost-effective biomanufacturing of fuels, chemicals, and specialty materials
- » Industrial biocatalysis requiring efficient electron transfer
- » Pharmaceutical production involving enzyme-mediated synthesis
- » Food and beverage industries leveraging enzyme transformations

ADVANTAGES

- » Enables use of low-cost, biomimetic non-canonical redox cofactors (NRCs)
- » Significantly enhances enzyme activity towards NRCs by up to 60-fold
- » Transferable motif allows broad enzyme engineering and customization
- » Improves electron delivery precision in biocatalytic processes
- » Reduces reliance on expensive natural cofactors like NAD(P)+

PATENT STATUS

Patent Pending

RELATED MATERIALS

- » Saleh S et al. A Sequence Motif Enables Widespread Use of Non-Canonical Redox Cofactors in Natural Enzymes. bioRxiv [Preprint]. Doi: 10.1101/2025.08.01.668186.

UCI Beall
Applied Innovation

5270 California Avenue / Irvine, CA
92697-7700 / Tel: 949.824.2683



© 2026, The Regents of the University of
California
Terms of use
Privacy Notice

