



Expanding the Protein Alphabet

What if recombinant proteins could do more than nature's 20 amino acids allow? acib develops protein-engineering workflows with non-canonical amino acids to introduce defined chemical handles, improve protein properties and enable new routes for conjugation, immobilization, analytics, biomaterials and biopharmaceutical development.

BACKGROUND

Most recombinant proteins are limited by the chemical functions of the natural amino acid alphabet. This restricts how precisely companies can tune properties such as stability, activity, solubility, labeling, conjugation, surface coupling, immobilization or resistance to degradation. Non-canonical amino acids (ncAAs) expand this toolbox. They can introduce azides, alkynes, fluorinated residues, protected groups, modified side chains or other new-to-nature chemical functions directly during protein biosynthesis. This enables protein variants that are difficult or impossible to obtain by standard recombinant expression or random chemical modification.

TECHNOLOGY

acib has long-standing expertise in tailored ncAA incorporation workflows for recombinant protein targets. The workflow starts with the desired product function – for example defined conjugation, improved stability, controlled surface coupling, enzyme immobilization or analytical labeling – and translates it into a suitable ncAA strategy.

Depending on the target protein, acib can evaluate global replacement of selected amino acids with structurally related ncAA analogs, site-specific incorporation at defined positions, or combined approaches. This enables both broad tuning of protein properties and precise installation of chemical functionality where it is needed.

The technical development covers the critical steps that determine whether an ncAA concept becomes a usable product route: host and expression-system setup, codon and incorporation strategy, ncAA feeding and cellular uptake, incorporation efficiency, product homogeneity, mass-spectrometric confirmation, purification, functionality testing and lab-scale bioprocess development.

OFFER

acib is looking for partners with recombinant proteins that require new chemical functions, improved properties or more controlled modification strategies. Together with industrial partners, acib can assess the target protein, define the most suitable ncAA strategy and develop a lab-scale feasibility workflow. Potential applications include click-conjugation handles, protein labeling, controlled surface coupling, diagnostic reagents, directed enzyme immobilization, modified enzymes, antibody fragments, scaffold proteins, vaccine antigens, biomaterials and analytical standards.

Project-specific IP can be transferred to you as our industrial partner.

EXPERTS

Dr. Birgit Wiltschi

DEVELOPMENT STATUS:

Technology Readiness Level 3-4
(Proof of concept to Technology Validated in Lab
– in several industrial projects)

KEYWORDS

- Non-canonical amino acids
- Genetic code engineering
- Recombinant proteins
- Protein functionalization
- Bioorthogonal chemistry
- Click chemistry
- Bioconjugation
- Protein immobilization
- Modified enzymes
- Diagnostics
- Biomaterials
- Biopharma
- Orthogonal translation systems
- Auxotrophic hosts
- Enzyme engineering
- Synthetic biology

CONTACT

Dr. Martin Trinker

Director Business Development & Fundraising
Austrian Centre of Industrial Biotechnology (acib)
Krenngasse 37 • A-8010 Graz

martin.trinker@acib.at

+43 720 270664 17

www.acib.at