CeBiTec – Quarterly

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Volker Wendisch receives 'Outstanding Achievement Award' at the conference ICB 2026 in Bejing

Professor Dr Volker Wendisch (59), Scientific Director at the CeBiTec, was presented with the 'Outstanding Achievement Award' at the 10th International Conference on Biorefinery and Biomanufacturing (ICB 2026) in Beijing. The conference provides a platform for researchers and innovators at the forefront of synthetic biology, green bioproduction and integrated biorefinery systems.

Wendisch has been Professor of Prokaryotic Genetics at the Faculty of Biology, Bielefeld University, since 2009 and heads a research group of the same name at CeBiTec. He has been a member of the Executive Board of the Industrial Biotechnology Cluster (CLIB) since 2023.

Photo taken at the award ceremony. ©V. Wendisch

(L. Wobbe; translation of a Bielefeld University press release)

Norbert Sewald is to receive the Josef Rudinger Memorial Lecture Award from the European Peptide Society (EPS)

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Professor Dr Norbert Sewald (64) is to receive the Josef Rudinger Memorial Lecture Award from the European Peptide Society (EPS). This award recognises significant professional contributions and is one of the highest honours in this field.

Peptides are organic molecules containing amino acids in a specific configuration. The EPS is thus honouring Sewald's research achievements in the field of peptide chemistry and his commitment to European peptide science. "His research approaches have helped to expand the synthetic toolkit of modern peptide chemistry and enable access to peptide-based structures that are difficult to achieve using conventional methods," the EPS states in its justification for the award.

Norbert Sewald coordinated the Marie Skłodowska-Curie Training Networks MAGIC-BULLET and Magicbullet::reloaded. He has been actively involved in building international networks, promoting scientific collaboration and supporting early-career researchers from many different countries. This commitment is also evident in his long-standing involvement with the European Peptide Society: he served, amongst other roles, as a member of the Committee for Scientific Affairs, as the Officer for Scientific Affairs and, from 2020 to 2024, as President of the Society.

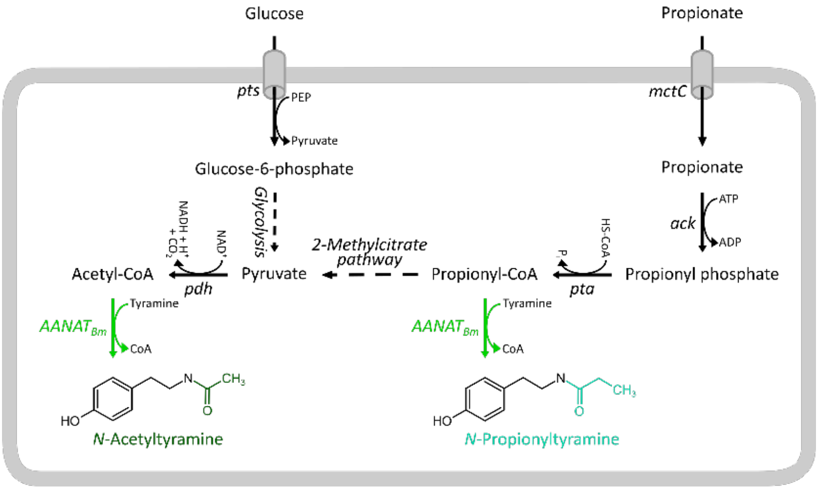
Professor Sewald has been Professor of Organic and Bioorganic Chemistry at Bielefeld University since 1999. In 2024, he received the Jörg Schwarzbich Inventor Award for outstanding innovation in recognition of his pioneering contributions to basic research into cancer drugs.

(L. Wobbe; translation of a Bielefeld University press release)

The Wendisch and Hammer labs established biotechnological *N*-acetyltyramine production

The rapidly increasing number of multidrug-resistant pathogenic bacteria poses a major global health threat and urgently calls for new antimicrobial strategies. *N*-Acetyltyramine has recently attracted growing attention as a promising antibacterial compound, having been reported to be active against a variety of multidrug-resistant pathogens. Besides its antimicrobial potential, *N*-acetyltyramine exhibits additional pharmaceutically relevant properties, including strong antioxidant activity and inhibitory effects on coagulation factor Xa and platelet aggregation, making it an attractive candidate for future therapeutic applications.

The Wendisch lab (Sara-Sophie Poethe, Lilli Sophie Kaimann, and Volker Wendisch) and the Hammer lab (Kai H. Schülke and Stephan C. Hammer) collaboratively established *de novo* production of *N*-acetyltyramine by *Corynebacterium glutamicum*. Sara-Sophie Poethe led the study and tested different *N*-acetyltransferase genes from bacteria and insects for catalyzing the *N*-acetylation of tyramine. *De novo* *N*-acetyltyramine production was establi-



Metabolic engineering strategy for the production of N-acetyltyramine and *N*-propionyltyramine in *C. glutamicum*; © S. Poethe

hed upon heterologous overexpression of the arylalkylamine *N*-acetyltransferase gene from *Bombyx mori* in a previously established tyramine-overproducing *C. glutamicum* strain. Combining genetic engineering to balance the gene expression levels of tyramine and N-acetyltyramine biosynthesis with the Design of Experiment-based media optimisation significantly improved production in shake-flask cultivation, resulting in a final titer of 2.5 ± 0.1 g/L *N*-acetyltyramine.

Beyond establishing *N*-acetyltyramine synthesis, supplementation with propionate as a second carbon source enabled *N*-propionyltyramine production, as verified by HPLC/MS analysis. This represents the first report of biotechnological *N*-propionyltyramine production and provides a proof-of-concept for expanding the product spectrum of tyramine derivatives by supplying alternative acyl-CoA donors.

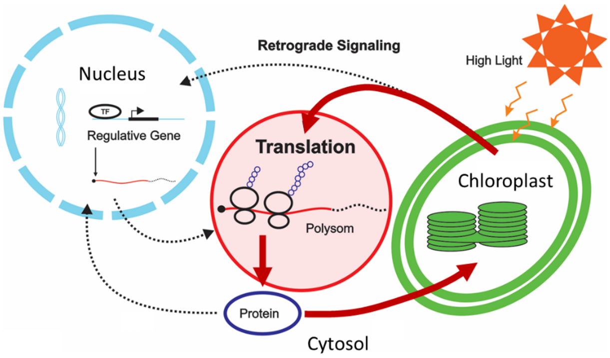
Poethe, S. S., Kaimann, L. S., Schülke, K. H., Hammer, S. C., & Wendisch, V. F. (**2026**). Engineering of *Corynebacterium glutamicum* for biosynthesis of the pharmaceutically active *N*-acetyltyramine: establishing and optimizing *de novo* production. *Journal of Biological Engineering*, ***20***(1), 105. [DOI: 10.1186/s13036-026-00713-1]

(S. Poethe)

Environmental changes target cytosolic protein synthesis in photosynthetic acclimation

For several decades, the paradigm of photosynthetic adjustment in response to environmental changes relied on retrograde control of nuclear gene expression. The research by Moore et al. (2026), just published in Molecular Plant, proves that there exists a faster regulatory circuitry that directly targets cytosolic protein synthesis. This mechanism accelerates the acclimation response to high light and also enables the tailored provision of needed proteins to chloroplasts in a spatially differentiated manner within the cell.

Plant cells have a single nucleus but up to 200 chloroplasts. Since the vast majority of chloroplast proteins is encoded in the nucleus, supply of most material to the chloroplast depends on transcription of nuclear genes, translation in the cytosol and import into the plastids. In a reverse flow of information, retrograde signals provide feedback on the chloroplast's metabolic state to the nucleus. The paper by Moore et al. (2026) describes a mechanism that is faster and likely spatially tuned: Retrograde signals from the chloroplast change cytosolic translation within a few minutes, allowing adjustments to chloroplast metabolism in response to a changing environment independent of changes in gene expression.



Chloroplast target cytosolic translation upon changes in the environment, allowing for immediate and rapid acclimation to the new conditions. ©K.J. Dietz

The first experiments on this research topic began 18 years ago in the group of Karl-Josef Dietz (CeBiTec, Faculty of Biology), based on the hypothesis that retrograde regulation of gene expression is insufficient for efficient adjustment of the photosynthetic machinery in response to environmental challenges. Marten Moore, the first author of this paper, began his research career as a Master's and PhD student in Dietz's group on this topic. Following his PhD, he went to the Australian National University in Canberra (Australia) to the group of Prof. Barry Pogson. Since then, in collaboration between Bielefeld and Canberra, a wide range of additional experiments elaborated and established this novel mechanism of fast retrograde control of cytosolic translation. Short sequences in messenger RNAs are both required and sufficient to mediate rapid adjustment of protein synthesis. The work was funded, inter alia, by the Schwerpunktprogramm 1935, DFG research grants, and a Discovery Grant in Australia, where Dietz was a collaborating partner. The genesis of this work demonstrates that establishing new concepts and making fundamental progress require stamina and perseverance. The results are of practical interest since the identified short regulatory elements will allow changes in protein abundance and thus in the acclimation ability of plants, independent of altering transcription, e.g., by genome editing.

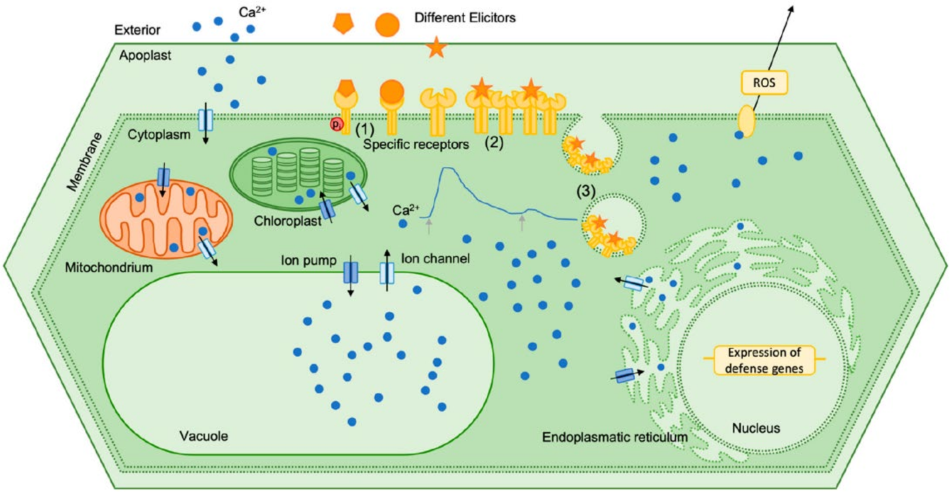
Moore M, Smith AB, Wegener M, Khambalkar PB, Victoria Tyrrell R, Camille Watts B, Nix SJ, Ting Tsang H, Farooq MA, Ganguly DR, Furbank RT, Ermakova M, Pogson BJ, Dietz KJ. **(2026)** Translation-dependent retrograde signaling coordinates high-light acclimation in plants. *Mol Plant.* Jul 7: S1674-2052(26)00221-2. doi: 10.1016/j.molp.2026.07.002. Epub ahead of print.
PMID: 42415418.

(K.-J. Dietz)

Lutter group publishes an article on refractory behaviour in plant cells in the journal “Plants”

The Lutter group published an article in *Plants* on refractory behaviour in plant cells — a topic they came across while working with tobacco cell cultures and developing a model for changes in cytosolic calcium concentration (calcium signature) in response to an elicitor. This phenomenon has not yet been fully understood, whereas, for example, the refractory behaviour in neurons has been very well characterised.

There is a period of time—the refractory period—after a stimulus during which plant cells can respond less or not at all to a stimulus of the same kind. However, throughout this refractory period, the cells remain responsive to a different stimulus. Even if the elicitor is “washed out” between two elicitations, the cells remain less responsive to a second stimulation of the same kind. Subsequent elicitations over a longer period, on the other hand, can trigger stronger Ca2+ responses, leading to so-called “defence priming”. Although refractory behaviour has been documented in various plant cell types, its underlying function and causative mechanisms remain unclear. In this review article, we provide an overview of the refractory machinery, including elicitors, receptors, typical Ca^{2+} responses, and signal transduction pathways. We shed light on possible explanatory scenarios and address open questions.



Model for refractory behavior in calcium signaling. Different elicitors are detected by surface-located pattern recognition receptors (PRRs). Perception of the signal leads to an influx of calcium ions through different calcium channels, resulting in an induced cytosolic calcium concentration. Thus, different defense responses are triggered, like, e.g., ROS production or expression of defense-related genes. After the event calcium is removed from the cytosol via specific calcium pumps. Numbers indicate different possibilities that are responsible for refractory behavior: (1) phosphorylation of PRRs leads to conformational changes and disables interaction with elicitor molecules, (2) clustering of receptors reduces the possible binding sites and reduces interaction between PRRs and elicitor molecules, and (3) receptor endocytosis removes the PRRs with bound elicitor molecules from the cell surface; the plant cell cannot respond to a new stimulus until new PRRs are synthesized and brought to the cell surface. © P.Lutter

Keßler, M. K., Fulek, V., Niehaus, K., & Lutter, P. (2026) Refractory Behavior in Plant Cells—Calcium Signaling Induced by Biotic Stress. Plants, 15(9), 1395. https://www.mdpi.com/2223-7747/15/9/1395

(P. Lutter)

Impressum

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