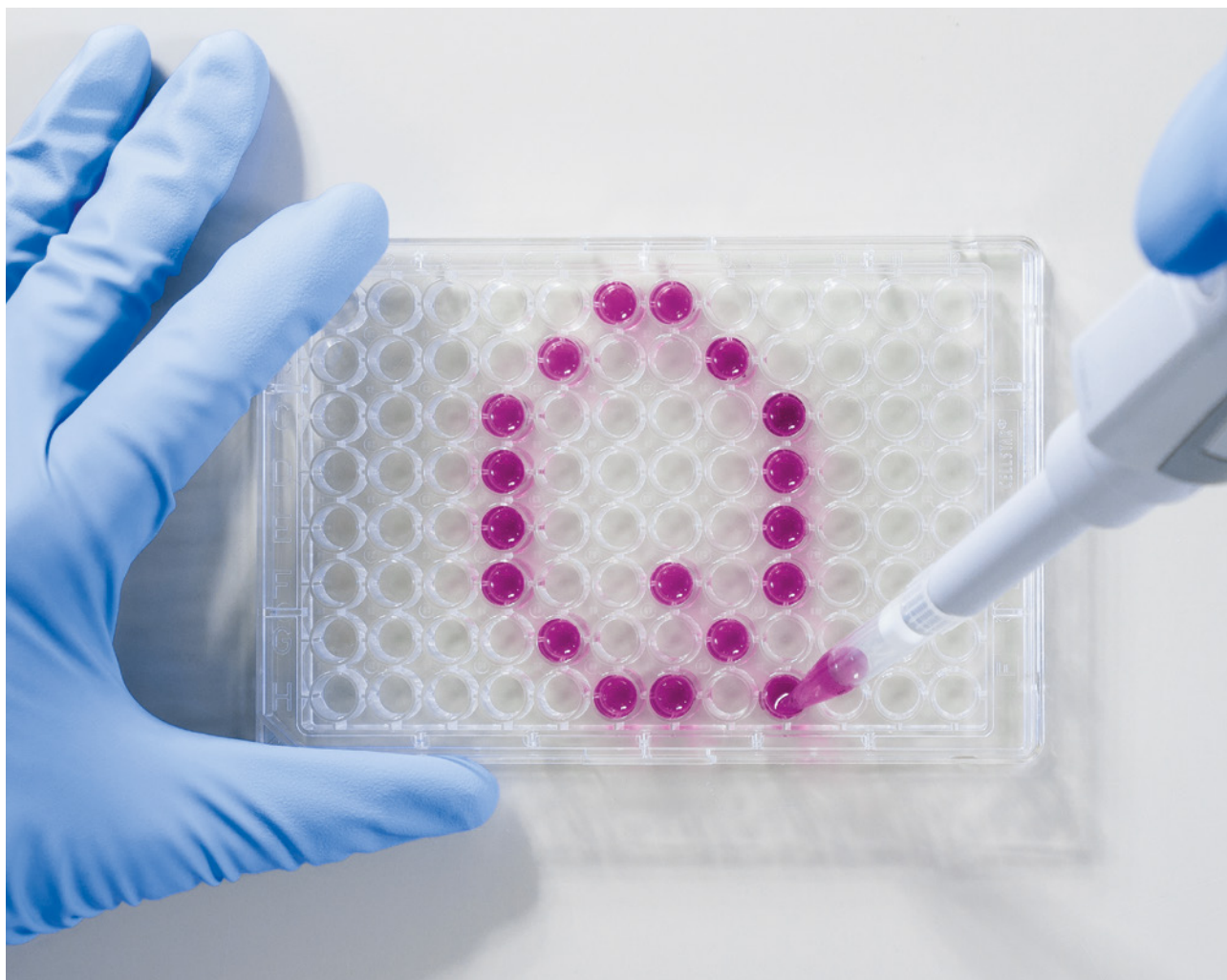


Cell culture solutions

High quality ingredients for research,
manufacturing and clinical applications

cQrex™



Why choose Evonik?

Evonik is the creative industrial group from Germany and one of the world's leading specialty chemicals companies with more than 33,000 Evonik employees. Media providers around the world and around the corner rely on our cell culture ingredients as we offer a unique combination of development expertise, manufacturing capabilities and service scope. Rooted in parenteral applications to exacting pharmaceutical standards and – with decades of experience in microbial fermentation – at home in biotechnology, Evonik's Health Care Business Line brings two worlds together in a hotbed of innovation for our customers.

You can count on us for consistent quality from minute to metric ton scale, from lab bench to volume production. Along with the product, we deliver the peace of mind that comes from working with a partner who is a global player with manufacturing facilities in France, Germany and China – and technical sales offices essentially everywhere you are.

Our sites are regularly audited and operate under one global quality system that follows the same standards. And we welcome your scrutiny.

Evonik Health Care's proven ability to address complex customer demands for

high quality cell culture nutrients comes from over sixty years of experience in manufacturing amino acids combined with advanced R&D capabilities, full back-integrated production and a global reach. It is one of the reasons we've become a preferred partner to the pharmaceutical and biotech industry.

If you are looking for cell culture ingredients, from biopharmaceutical research & development to production and even clinical applications, and need a solution provider with outstanding service and supply reliability, you've come to the right place.

cQrex™ IS THE EVONIK BRAND FOR CELL CULTURE SOLUTIONS WITH SCIENTIFICALLY PROVEN BENEFITS

- **Highly purified amino acids:** the reliable basis for reproducible cell culture media performance
 - **Chemically defined boosters:** peptides and ketoacids overcoming key challenges in mammalian cell culture
 - **Products on demand:** customized media ingredients from functionalized amino acids to complex molecules
 - **Application services:** screenings and booster development at your disposal
- All products are animal-origin free and readily available at commercial scale.**

MORE THAN AN INGREDIENT PROVIDER – A SOLUTION PROVIDER

Quality is at the center of everything we do

Small differences in raw material quality can have a major impact on efficient cell cultivation. Evonik combines experience in the manufacture of clinical grade material with expertise in biotechnology to provide excellent solutions for cell culture users.

Our cQrex™ range of products is designed to cover the spectrum of applications from biopharmaceutical R&D and manufacturing to medicinal applications.

The highest purity standards are of course imperative to guarantee reproducibility and meet the toughest regulatory standards. Beyond the fact that we do not use any animal derived compo-

nents, our approach to ensuring consistency in terms of quality and reproducible performance builds on a quality system that allows a smooth transfer from R&D to regulated production or clinical applications.

Evonik Health Care stands for unique transparency: all manufacturing is in-house and with an excellent degree of backward integration.

Naturally, certificates of suitability of Monographs of the European Pharmacopoeia (CEPs) and Drug Master Files (DMFs) are available for most products.

STANDARD QUALITY CONTROL TESTING FOR cQrex™ CELL CULTURE INGREDIENTS

FINISHED PRODUCT TESTING

METHODOLOGY

Identification	Specific rotation, IR, TLC
Assay	USP / EP / JP
Specific rotation	USP / EP / JP
Transmittance (replacing appearance test)	Appearance of solution: EP
Water content	USP / EP / JP
Sulphated ashes	USP / EP / JP
Salts (Chlorides, sulphates, ammonia)	USP / EP / JP
Heavy metals, iron, arsenic	USP / EP / JP
Impurities	USP / EP / JP : TLC, HPLC
Endotoxins	USP / EP / JP
Microbiology	USP / EP / JP



Our products

At the core of our solutions: a knowledge of chemistry, biotechnology and the building blocks of life that is unparalleled in its depth and breadth.

Amino Acids

We understand that amino acids are key constituents of cell culture media and feeds. For our partners in the pharma and biotech industries, we can guarantee products that meet precise purity standards and fulfill key requirements

for cell culture research, development and production. This we combine with unrivalled supply security. In addition to the proteinogenic L-amino acids we also offer a range of D-, DL- and non-proteinogenic amino acids.

Please contact us with your exact requirements. You can find our full product list on the last page of this brochure.

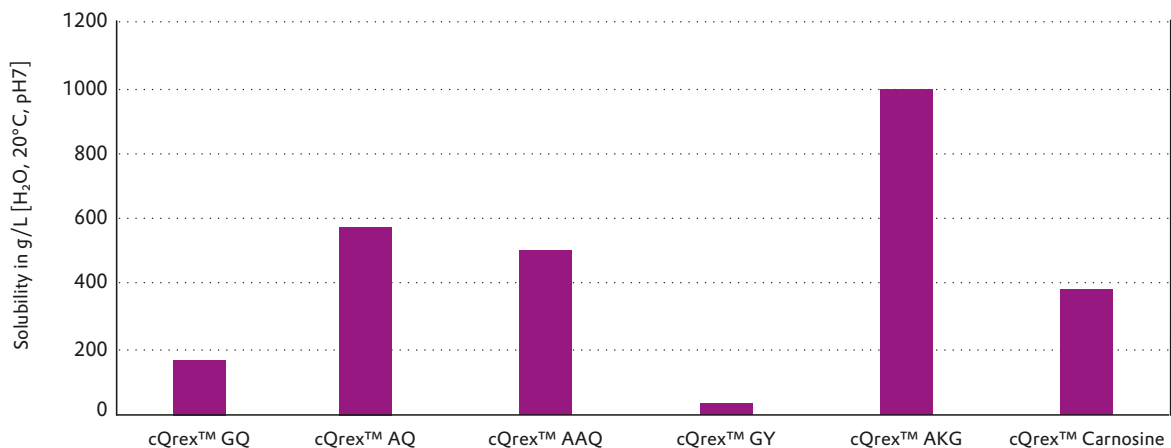
Boosters

When performance is of the essence, it helps to have the right tools available. The cQrex™ standard booster lineup consists of peptides, keto acids, special amino acid and derivatives. They are designed to stabilize components to prolong longevity, solubilize critical constituents, increase productivity, and help manage the concentration of critical metabolites. All boosters are readily available at commercial scale.

OUR cQrex™ STANDARD BOOSTERS

Name	Chemical name
cQrex™ AKG	α -Ketoglutaric acid
cQrex™ AQ	L-Alanyl-L-glutamine
cQrex™ AAQ	N-Acetyl-L-alanyl-L-glutamine
cQrex™ GQ	Glycyl-L-glutamine hydrate
cQrex™ GY	Glycyl-L-tyrosine dihydrate
cQrex™ Carnosine	β -L-alanyl-L-histidine

SOLUBILITY OF cQrex™ BOOSTERS



cQrex™ GY

- ▶ Get up to 60 times more tyrosine in a neutral feed than with the free amino acid

cQrex™ AKG

- ▶ A scientifically proven performance enhancer and protectant against oxidative stress

cQrex™ AQ and GQ

- ▶ Avoid detrimental effects on cells and product by using stabilizing glutamine. The choice between alanine- and glycine peptides provides flexibility in media design

cQrex™ AAQ

- ▶ A powerful booster of cell-specific productivity that can prevent lactate accumulation

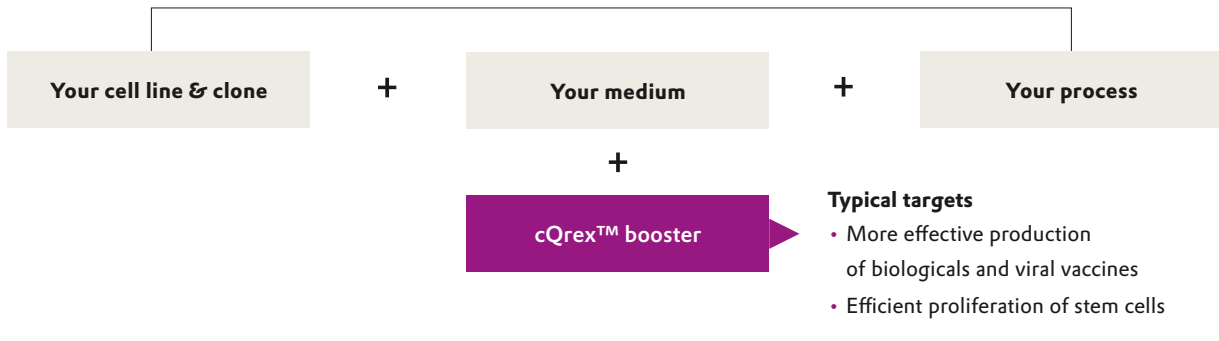
cQrex™ Carnosine

- ▶ Prevents and even reverses senescence in primary and stem cell cultivations

cQrex™

- ▶ The Evonik brand for performance-enhancing cell culture solutions with clearly documented benefits

A NEW LEVER IN YOUR CULTIVATION PROCESS



Customized products

Evonik Health Care's flexible dipeptide technology can match virtually almost any need – up to metric ton scale. If what you need is a non-natural amino acid as linker in your mAB, count on our expertise in chemistry and biotechnology to identify a fast and efficient process design. Your desired ingredient is not an amino acid? Take advantage of

our decades-long experience in chemical and pharmaceutical custom manufacturing – we can develop and scale up almost any compound. Should your desired ingredient be produced by bacterial fermentation, rest assured that it is in good hands with one of the largest and most respected players in industrial biotechnology.

And if you have developed and patented a new compound and are looking for a partner to ramp up commercialization, you will see that exclusive synthesis and production are among our core capabilities as well.

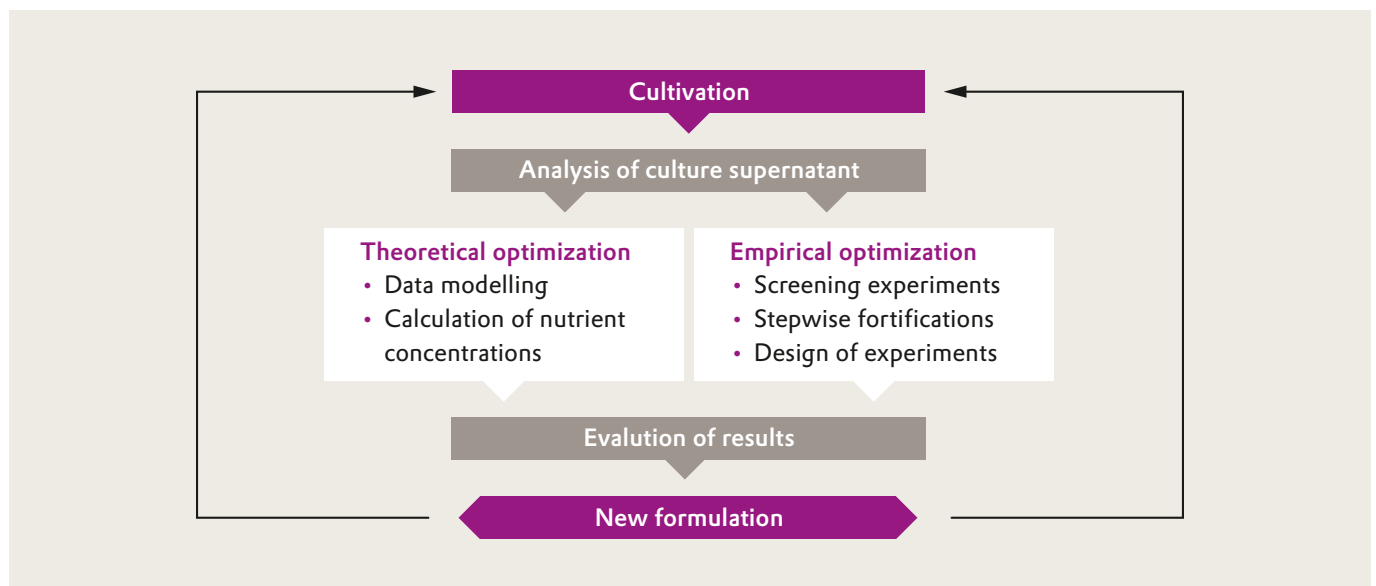
Value-adding services

Customized services for our product and your targeted development.

Have you already selected a production medium? In that case we can assist with testing new reagents and supplements or optimizing commercial media. Custom solutions range from special products, e.g. peptides for cell culture media R&D to special packaging, including 1 kg bags.

In addition, all screening and development activities can be rationalized by using our capabilities in statistical planning and DoE (Design of Experiments). With technical services that span the gamut, we can add value at every stage on the path to market. And that includes

being at your side every step of the way towards regulatory approval. Here, our deep understanding of regulatory demands and frameworks – including a carefully curated Drug Master File – serves to avoid pitfalls and achieve your goal in time.



TECHNICAL

MILLING

- Pin mill
- Hosokawa/jet mill

MIXING/BLENDING

- Paddle dryer
- Cone dryer
- Vacuum mixing dryer
- Slanting dryer

PACKAGING

We offer various solutions to meet customer requirements

ANALYTICAL SERVICES

- Amino acid analyses
- Malvern particle size measurements
- Microbiological measurements
- Cell culture media testing
- Mass spectrometry

This information and all further technical advice are based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

cQrex™ – trademark of
Evonik Industries AG and its subsidiaries.

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EVONIK NUTRITION & CARE GmbH
Health Care Business Line
Pharma & Food Ingredients

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