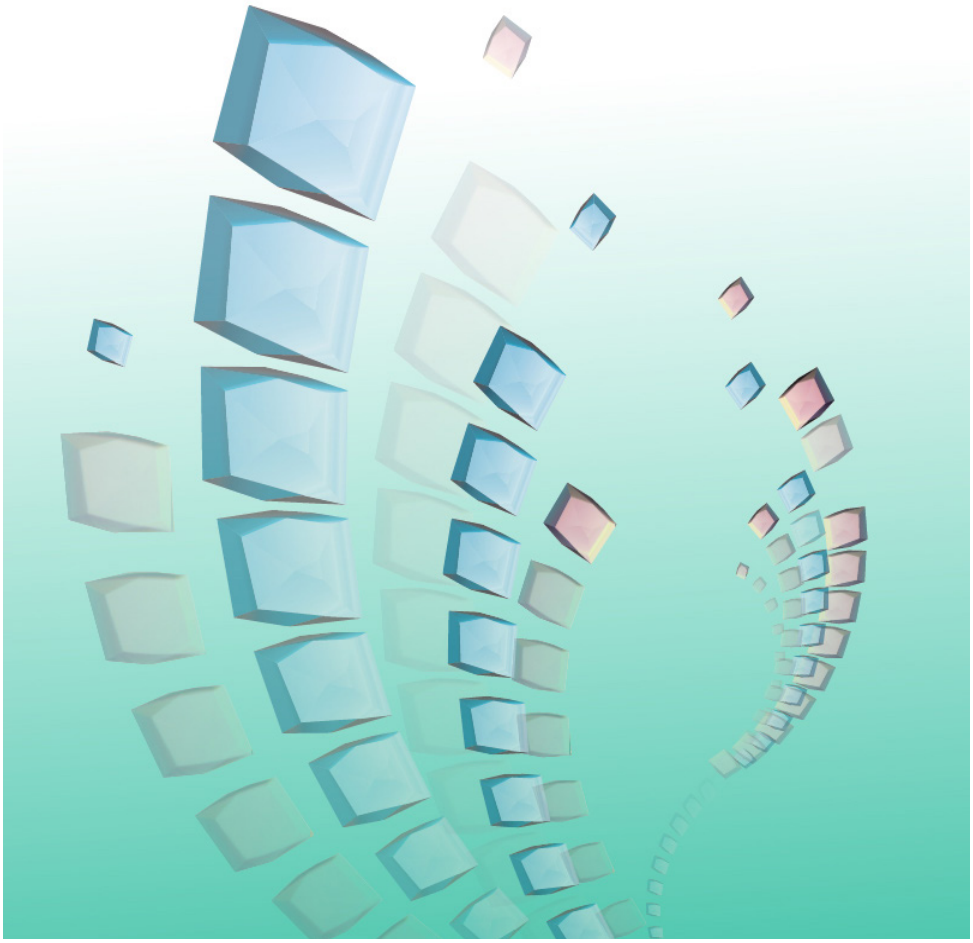
Paras Biopharmaceuticals Finland Oy

Paras NobleCleav® Technologies



Paras Biopharmaceuticals Finland Oy

(Microbial Biologics CDMO, Biosimilars & Bioprocess Enzymes)

NobleCleav®
- An Innovative Technology for Production of Difficult Therapeutic Proteins

NobleCleav® Technology

NobleCleav® is a propriety technology for efficient process- ing of recombinant therapeutic peptides and therapeutic proteins. The technology facilitates high level production of authentic biologics by combining high specificity and activity of processing. The technology significantly reduces wastage of the biologics during processing and thereby increases yields and significantly brings down the cost of production of biologics.

Technology Approach

Paras Biopharmaceuticals technological approach is solely focused on achieving a successful product development. As a result there are two main features that drive our technological innovations.

• Work is only performed in the laboratory on processes which can be successfully and economically scaled up. An understanding of industrial scale production approach eliminates many unnecessary steps which normally become bottlenecked in an ordinary approach.

• We focus and utilize only the most efficient process steps to achieve success whilst optimizing each step in relation to customer needs, keeping quality in mind.

• We successfully combine scientific expertise and proven industrial forming a solid foundation which allows economic product and process developments take center stage.

Technology for peptide therapeutics

	Chemical synthesis	Recombinant production
Small peptides:	√	X
Proteins:	X	√
Large peptides:	X	√

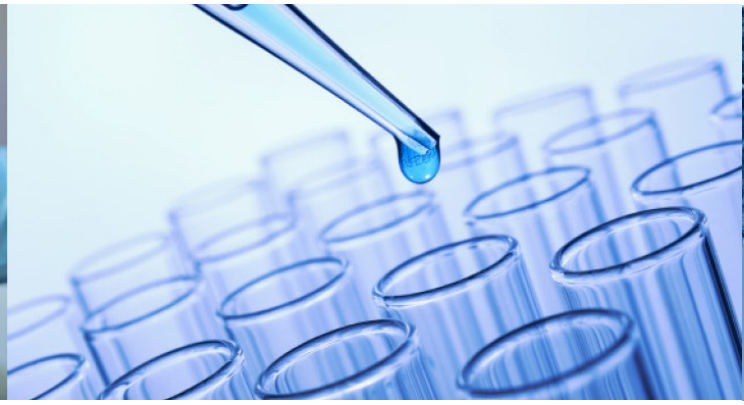
Peptides are rapidly growing therapeutic market. Two routes to make.

Paras Propriety Expression Vector

Paras Biopharmaceuticals has developed propriety expression vectors which incorporate a specially designed gene cassette. All genes are individually optimized using the most advanced gene optimization programs available in the world. Paras utilizes the most advanced knowledge to achieve the highest expression codon sequences for genes.

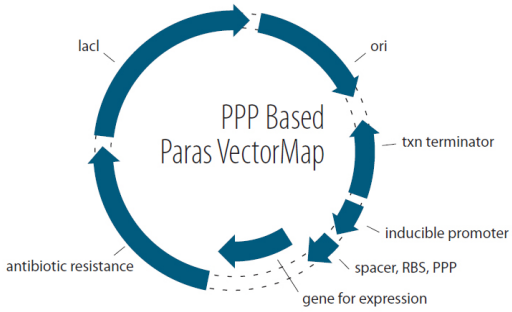
Paras propriety vector consists of unique signal sequences, promoter sequences, suitable spacers, Paras propriety partner sequences, and optimized gene codon sequence for therapeutic protein. Expression vectors also include suitable antibiotic resistance markers for the clone selection.

Recombinant clones are tested for their expression levels, stability and evaluated for highest expression of therapeu- tic protein targets. All vectors are authenticated by DNA sequencing to ensure the presence of the correct inserts in the vector.



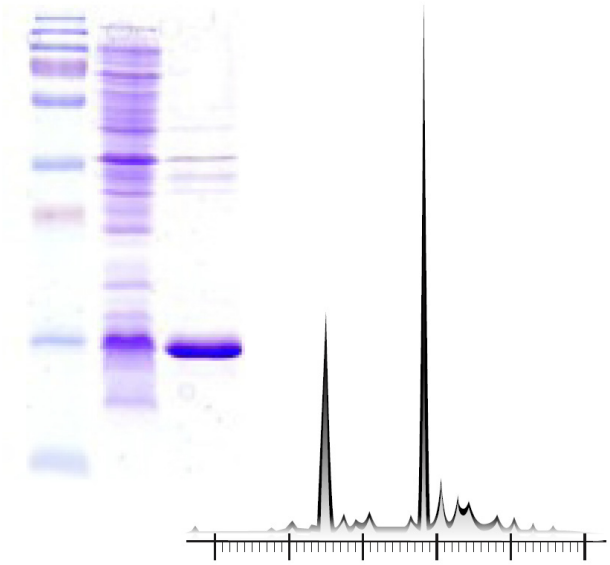
Technology Features

• Optimum plasmid copy number
• Includes vectors that are most suitable for E. coli expression systems
• Incorporates tightly controlled protein expression
• Enables high expression yields, even for difficult and challenging proteins
• Cleavage generates authentic N and C- terminus
• Incorporates gene construct with Paras Propriety Partner PPP and spacers suitable for high expression



Plasmid Map of Paras propriety Vector for *E. coli* Expression System

Product Expression and Validation

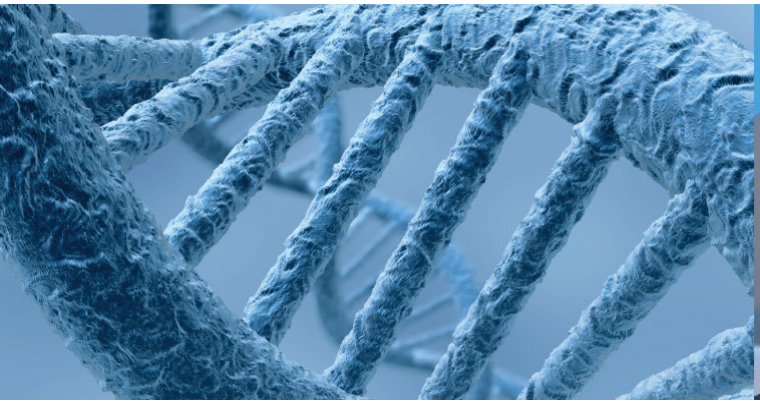


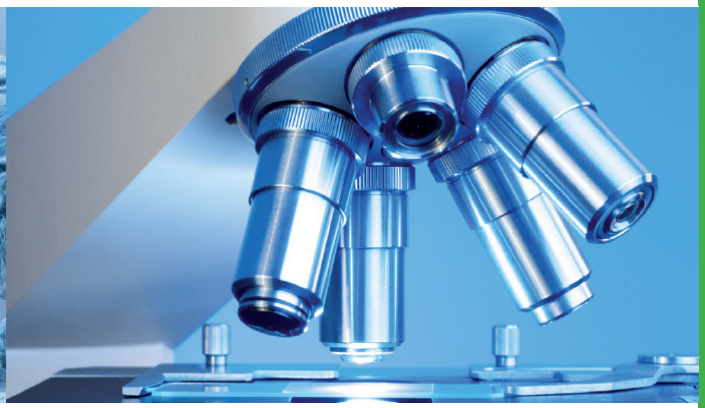
SDS-PAGE Showing Paras Protease 2 production with MS data.

Advantages of Noble Cleav® technology

Noble Cleav® technology allows:

• Innovative technology developed by Paras Biopharmaceuticals successfully results in quality biopharmaceutical products with comparative biological activity of the product.
• Platform enables new and innovative ways employing combined unique expertise to perform cleavage of proteins with a fusion partner.
• Increased specificity and activity of processing
• Decreased wastage and therefore decreased production costs





NobleCleav®

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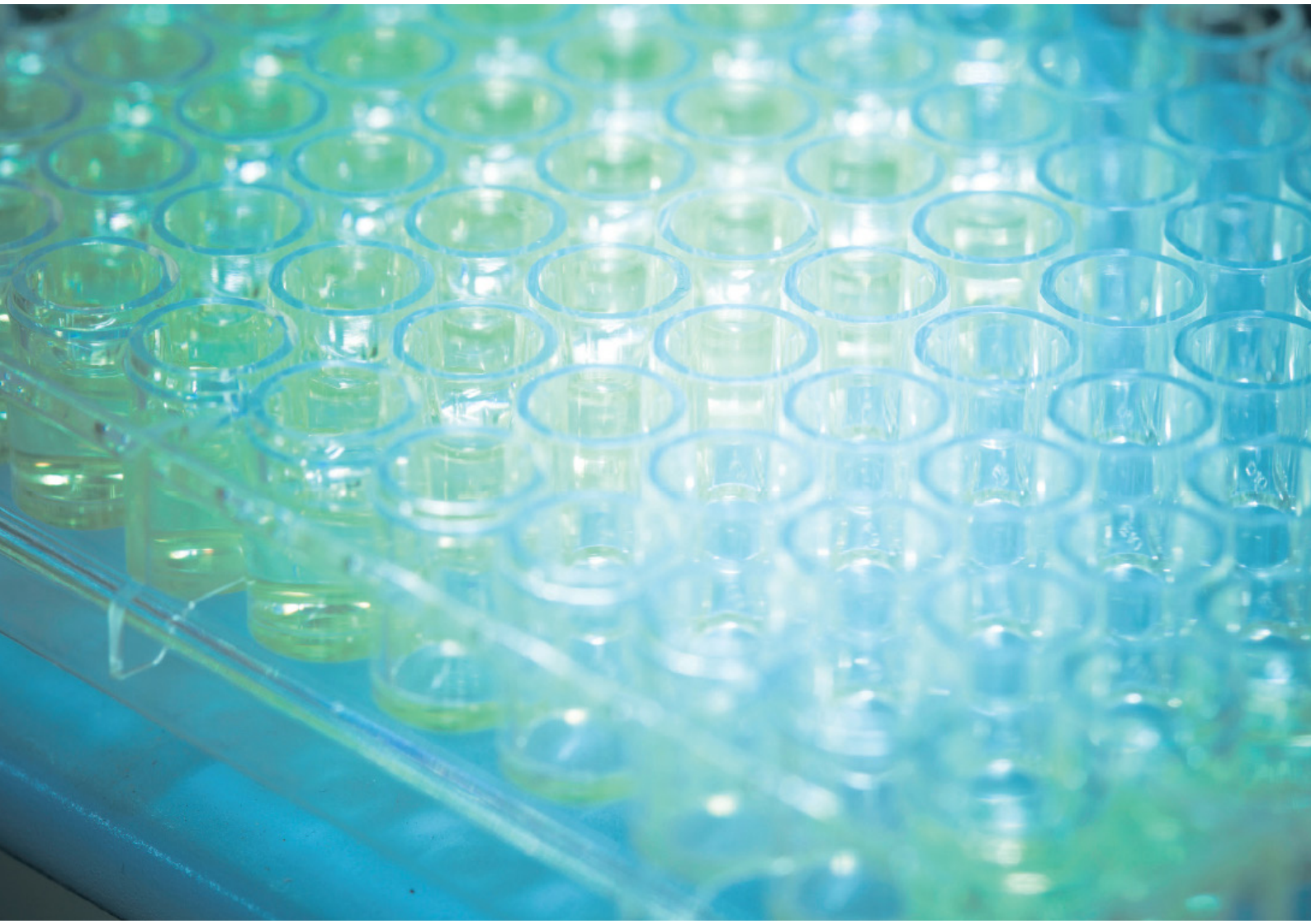

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