



# Kolliphor<sup>®</sup> P188 Bio use in cell & gene therapy applications

Biologic Solutions



# BASF Biologic Solutions Platform

We leverage our strength in chemistry to benefit the biologics industry



**We aim to provide high quality products within our core chemistries and expand the industry body of knowledge around their application in biologics, including Cell & Gene Therapy**

# We are a key supplier of pharmaceutical raw materials for >70 years

History of driving chemical innovation to solve key challenges



Poloxamer 188 was developed for oral and topical pharmaceutical applications

1960



Cell culture process intensification

2000



Collaborative investigation

2014



Cell & Gene Therapy applications

2020

1980



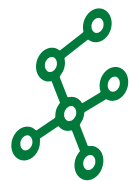
Cell culture manufacturing applications

2012



Variability in cell culture reported to BASF

2016



Kolliphor® P188 Bio launch

# Kolliphor® P188 Bio is designed for cell culture manufacturing

Pioneering deeper understanding of shear protection mechanism



## Study

Mechanisms of shear protection.



## Develop

Sensitive assay to detect hydrophobic species.



## Manufacture

Product with minimal hydrophobic species.

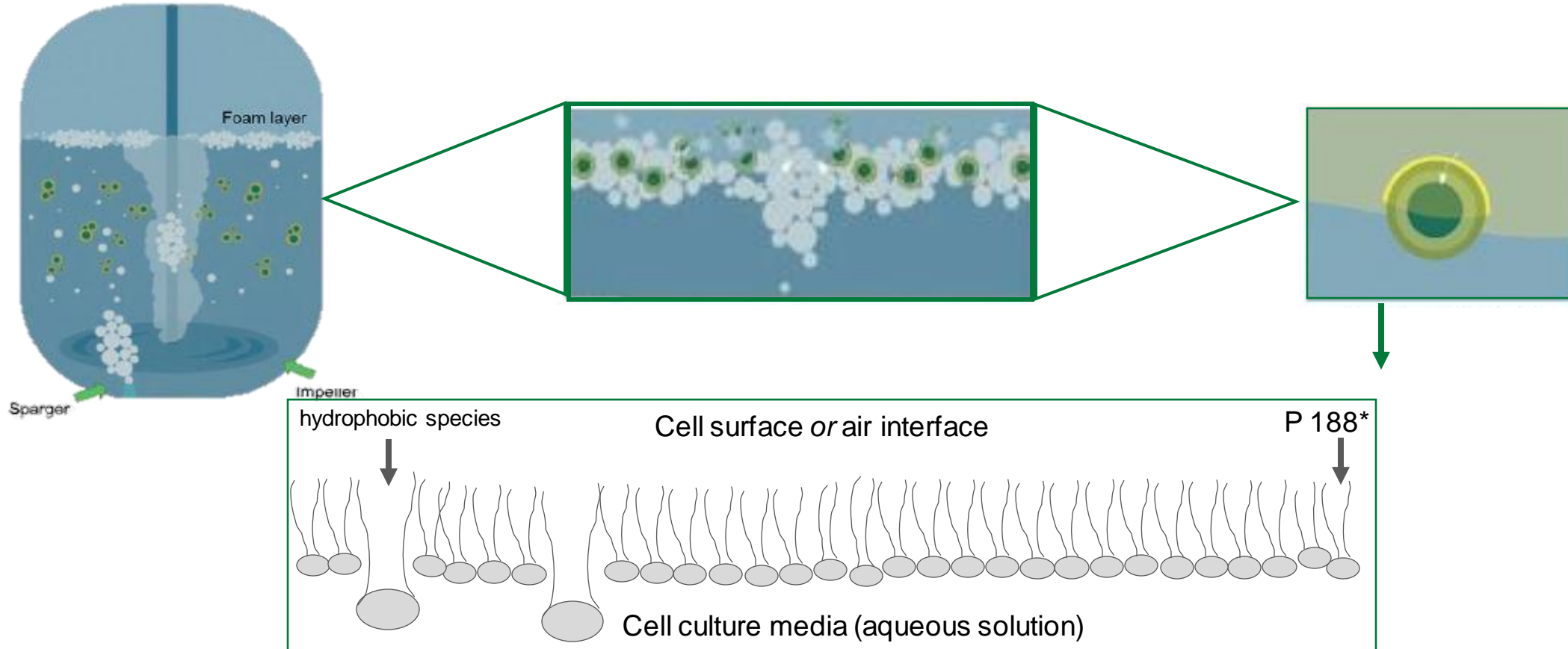


## Kolliphor® P188 Bio

Mechanics of shear protection led its development.

# Our hypothesis: P188 forms a pseudo-coating around cells

Disruption by hydrophobic species leads to reduced functionality



## Hydrophobic species:

- are surface-active
- are more hydrophobic than P 188
- outcompete P 188 at interfaces
- disrupt ordered arrangements of P 188

## Poloxamer 188:

- is surface-active
- forms ordered arrangements at interfaces

\* HMW & LMW P188 species have slightly longer/shorter tails, as shown. This does not disrupt the ordered arrangement of the poloxamer along an interface.

# Hydrophobic species are minimized in Kolliphor® P188 Bio

Manufacturing controls and optimized testing are critical



## Manufacturing

Kolliphor® P188 Bio is manufactured in the Geismar, Louisiana site



## Cleaning

Wash water testing after steam and water cleaning confirms lower TOC before manufacturing of Kolliphor® P188 Bio



## RP-HPLC

Every lot of Kolliphor® P188 Bio is tested by a validated RP-HPLC method for confirmation of minimal hydrophobic species



## Live testing

Additional cell culture testing is performed on CHO cells



# Kolliphor® P 188 Bio is designed for use in biologics manufacturing

Premium testing, packaging, and regulatory documents



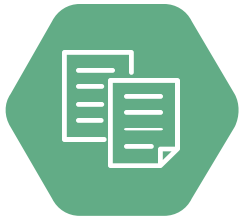
## Microbial Testing

- Total Yeast and Molds Count (TYMC)
- Total Anaerobic Microbe Count (TAMC)
- Endotoxin



## HPDE Packaging with double liners

- Wipeable & Non-Fibrous.
- Easily stacked



## Regulatory Documents

- cGMP statement
- EP, JPE & USP compliance
- Drug Master File (DMF)



102 kg

25 kg

12.5  
kg

5  
kg

# BASF Biologic Solutions Platform

Our global team continues to grow

**North America**



Phil Butler

**Europe**



Philipp Hebestreit

**Global Strategic Marketing (Lead)**



Tonya Jackson

**Technical Marketing**




Nadya Morales-Cummings

**South America**



Martin Pitkowski

**Asia**



Yukihiro "Nicky" Niitsu

Contact us: [Pharma-solutions@basf.com](mailto:Pharma-solutions@basf.com)



# Legal Disclaimer

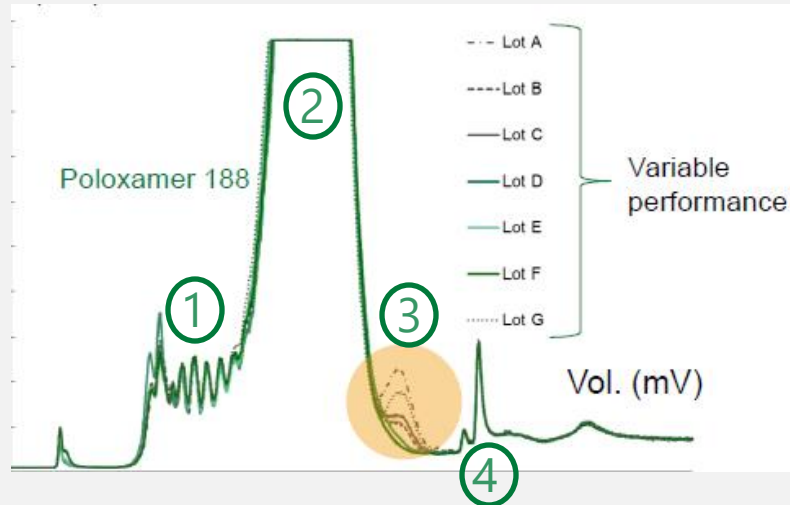
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We create chemistry

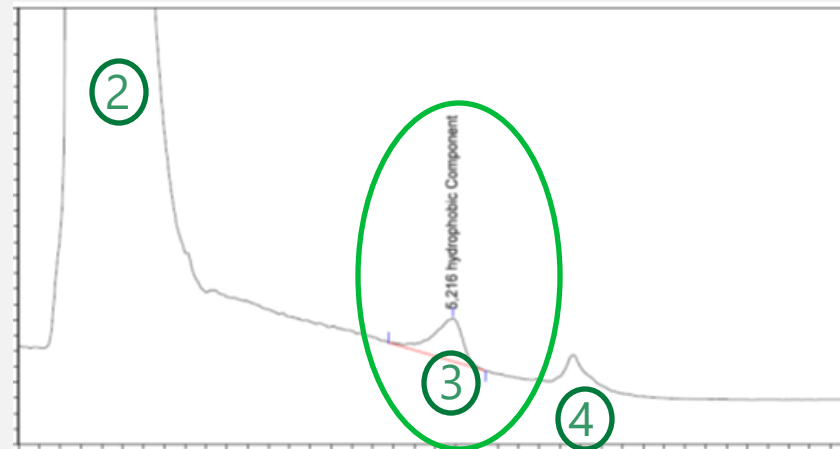
# We ensure the hydrophobic species are below the limit using an optimized & validated RP-HPLC test

## Original Method



- RP-HPLC assay was developed to detect ppm quantities of hydrophobic species
- Wide variability was detected among historical P 188 lots

## Optimized Method



- BASF further optimized the assay to ensure LOD below 250ppm
- Kolliphor® P 188 Bio hydrophobic species specification is max. 250ppm

- ① LMW P 188 species
- ② Main P 188 peak
- ③ Hydrophobic non-P 188 species
- ④ HMW P 188 species

# Kolliphor® P 188 Bio: chemistry, properties, selected references



PEO: Polyethylene oxide; PPO: Polypropylene oxide; Poloxamer 188: a = 80; b = 27

## Parameter

## Typical value

Average molecular weight  
(based on hydroxyl value)

7680 – 9510

Ethylene oxide content in the polymer

79.9 – 83.7 % (w/w)

pH value (10% solution in water)

5.0 – 7.5

Critical micelle concentration

$4.8 \cdot 10^{-4}$  mol/L

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