



# HEMOXCell<sup>®</sup>

NATURALLY BOOST CELL GROWTH



## INTRODUCTION

Hemarina, a spin-off of CNRS\*, was founded in 2007, with its core research framework based on the discovery of a new oxygen carrier.

Hemarina has discovered that our planet's seas contain solutions to the development of **safe and effective biomaterial of non-mammalian origin**. Our continuous research and development efforts have opened the door to the production of biomaterial sourced from a specific marine invertebrate. Hemarina offers products that constitute a **decisive technological breakthrough**.

Hemarina has filed 6 patent families for this technology. After all, oxygen is essential to life. **Cells need an optimal oxygen level for healthy metabolism** and Hemarina find the way to do so. **HEMOXCell®** technology is based on a marine-biomaterial able to deliver oxygen to cells and being used in a large field of applications where oxygen is required.

*\*CNRS is the French National Center for Scientific Research*

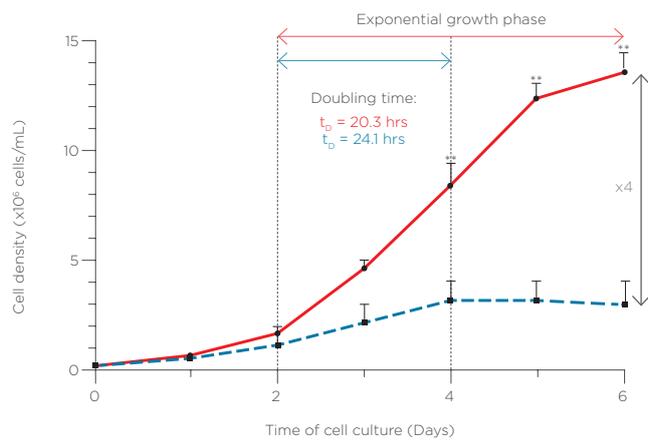


## HOW DOES IT WORK?

**HEMOXCell®** patented technology is based on a marine macroparticle able to carry 156 molecules of oxygen when saturated. **HEMOXCell®** is a ready-to-use solution. **HEMOXCell®** brings oxygen and releases it according to the PO<sub>2</sub> gradient (the demand of oxygen). **HEMOXCell®** also have anti-oxidative properties (SOD activity) which help reducing reactive oxygen species production.



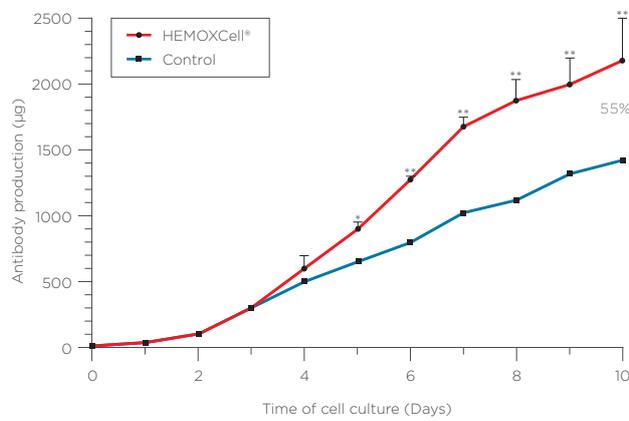
## PERFORMANCE TESTS



### CELL DENSITY

Cell Proliferation increase of 400%

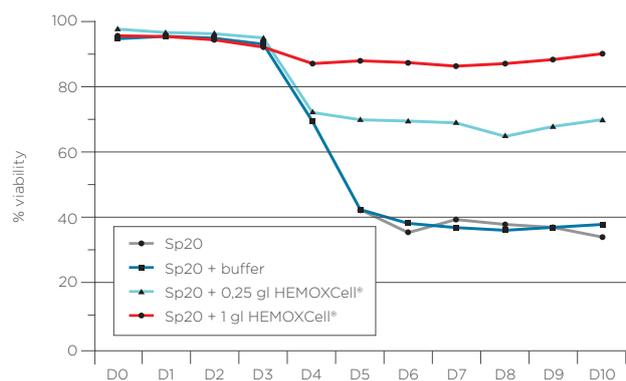
CHO-S cells cultivated in CD-CHO serum-free medium completed with **HEMOXCell**<sup>®</sup>. Set up a dose-response range to determine the optimal concentration for your cell line.



### ANTIBODY PRODUCTION

Protein production increase of 55%

Compared to control, productivity increases by approximately 55% with **HEMOXCell**<sup>®</sup>.



### VIABILITY

Maintain of viability in various cell lines

Viability results shown were obtained testing a SP2/O cell line.

## ▲ ADVANTAGES OF *HEMOXCell*<sup>®</sup>

Compared to traditional cell growth activators, *HEMOXCell*<sup>®</sup> offers significant advantages:

- ▲ *HEMOXCell*<sup>®</sup> increases yields without requiring any changes in cell culture conditions.
- ▲ *HEMOXCell*<sup>®</sup> is a ready-to-use solution.
- ▲ *HEMOXCell*<sup>®</sup> provides ideal conditions for cell culture with suitable oxygenation and without damage generated by over-oxygenation or metabolic wastes.
- ▲ *HEMOXCell*<sup>®</sup> as an anti-oxidant activity.
- ▲ *HEMOXCell*<sup>®</sup> has been tested with several cellular lines (CHO-320, CHO-S, MSC, Sp2/O, and NS0), yielding excellent results.
- ▲ *HEMOXCell*<sup>®</sup> is stable and functional between +4°C and +37°C.
- ▲ *HEMOXCell*<sup>®</sup> acts at low concentration (0.025 mg/mL).
- ▲ *HEMOXCell*<sup>®</sup> is mammalian-free.

## ▲ BENEFITS OF *HEMOXCell*<sup>®</sup>

For any work in cell culture, even for cell lines difficult to grow, *HEMOXCell*<sup>®</sup> allows you:

- ▲ **Better cellular growth rate**
- ▲ **Higher antibody productivity**
- ▲ **Higher recombinant protein productivity**
- ▲ **Higher cell viability**

## ▲ CONCENTRATION TO USE *HEMOXCell*<sup>®</sup>

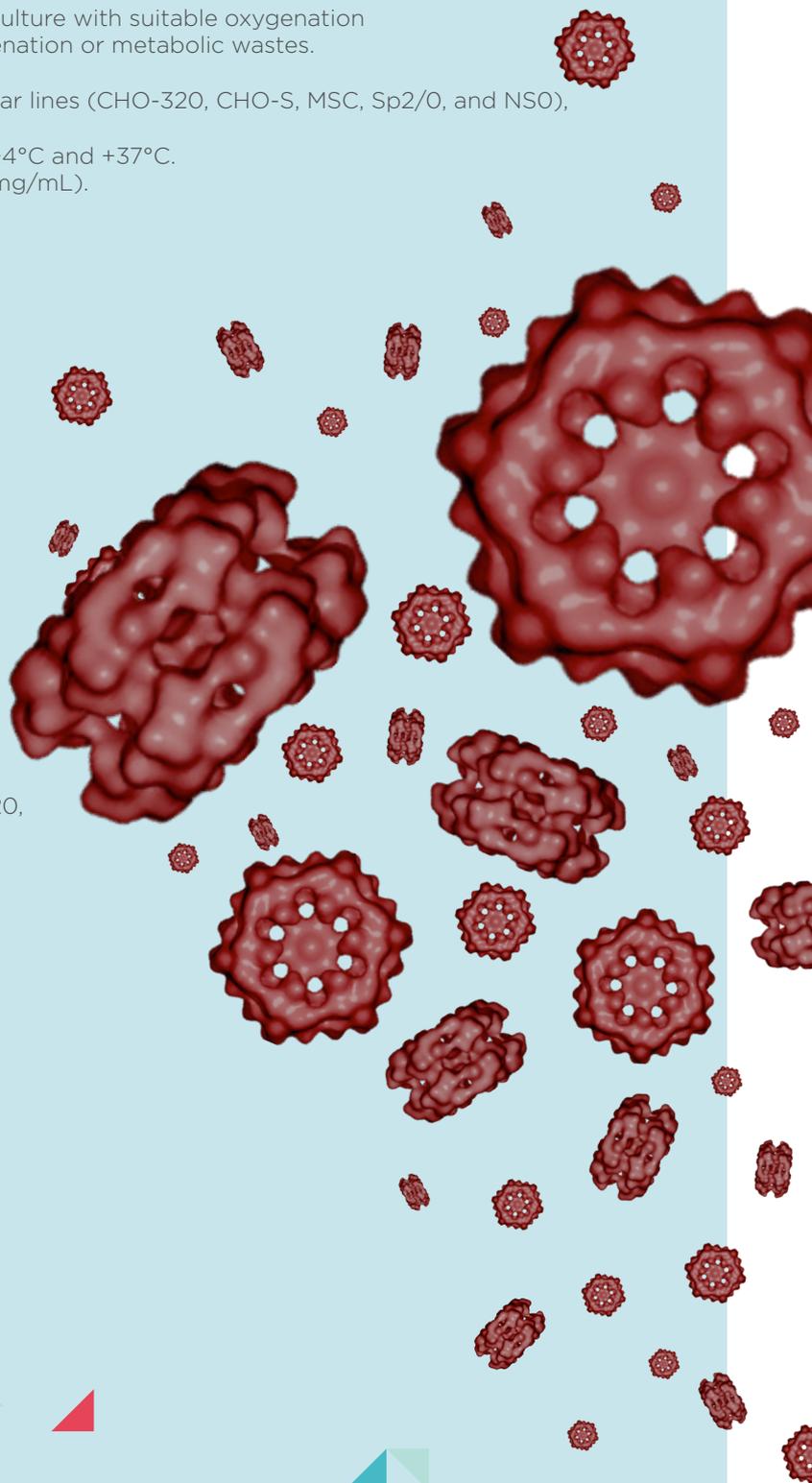
The optimum concentration defined with CHO-320, for example, is: 0.025 mg/mL.

One sample of *HEMOXCell*<sup>®</sup> 1 (see table below) can be tested in 2 L of media at 0.025 mg/mL. We recommend to perform a dose-ranging test on your own cell line.

## ▲ CULTURE CONDITIONS

**Microplate:** 50 milligrams of *HEMOXCell*<sup>®</sup> are sufficient to perform 100 x 96-Well plate cultures.

**Bioreactor:** 2.5 g of *HEMOXCell*<sup>®</sup> are sufficient to prepare 100 L media at 0.025 mg/mL.



## FEATURES

### COMPOSITION

- ▲ Natural extracellular biomaterial in suspension in a dedicated buffer

### CHARACTERISTICS

- ▲ Biological product of non-mammalian origin
- ▲ HEMOXCell® is a macromolecule of 3.6 MDa

### REFERENCE NUMBER

|                               | HEMOXCell®<br>1 | HEMOXCell®<br>2 | HEMOXCell®<br>3 | HEMOXCell®<br>4 | HEMOXCell®<br>5 | HEMOXCell®<br>6 |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Quantity of HEMOXCell®        | 50 mg           | 250 mg          | 500 mg          | 1 g             | 2,5 g           | 5 g             |
| Quantity of HEMOXCell® buffer | 4 ml            | 20 ml           | 40 ml           | 80 ml           | 200 ml          | 400 ml          |

### SPECIFICATIONS

- ▲ **Range:** Mostly used concentration around 0,025 mg/mL
- ▲ **pH:** 7.1 ± 0.2
- ▲ **Osmolarity:** 303 ± 10 mOsm/kg

### MICROBIOLOGICAL CHARACTERISTICS

- ▲ Aseptic manufacturing process
- ▲ Microbial contamination free
- ▲ Sterility guaranteed

### STORAGE & SHIPMENT CONDITIONS

- ▲ Storage at ≤ -80°C
- ▲ Delivery in pool box at -30°C

### LIFETIME

- ▲ 3 years at -80°C

#### HEMOXCell, a New Oxygen Carrier Usable as an Additive for Mesenchymal Stem Cell Culture in Platelet Lysate-Supplemented Media.

Le Pape F, Cosnuau-Kemmat L, Richard G, Dubrana F, Férec C, Zal F, Leize E, Delépine P.  
Artif Organs. 2017 Apr;41(4):359-371.

#### Advancement in recombinant protein production using a marine oxygen carrier to enhance oxygen transfer in a CHO-S cell line.

Le Pape F, Bossard M, Dutheil D, Rousselot M, Polard V, Férec C, Leize E, Delépine P, Zal F.  
Artif Cells Nanomed Biotechnol. 2015 Jun;43(3):186-95.

#### Comparison of Perfluorodecalin and HEMOXCell as Oxygen Carriers for Islet Oxygenation in an In Vitro Model of Encapsulation.

Rodriguez-Brotos A, Bietiger W, Peronet C, Langlois A, Magisson J, Mura C, Sookhareea C, Polard V, Jeandidier N, Zal F, Pinget M, Sigrist S, Maillard E.  
Tissue Eng Part A. 2016 Dec;22(23-24):1327-1336.

#### Evaluation de la contribution d'une hémoglobine marine dans la culture cellulaire et dans la cellularisation de substituts osseux et méniscaux par des cellules souches mésenchymateuses

Thèse d'université, Université de Bretagne Occidentale, soutenue le 21 Janvier 2016  
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