Welcome to Jellagen - Corporate Presentation

Collagen Type-0: A next generation marine sourced biomaterial for medical tissue regeneration

December 2020

Jellagen, a transformative biomaterial company

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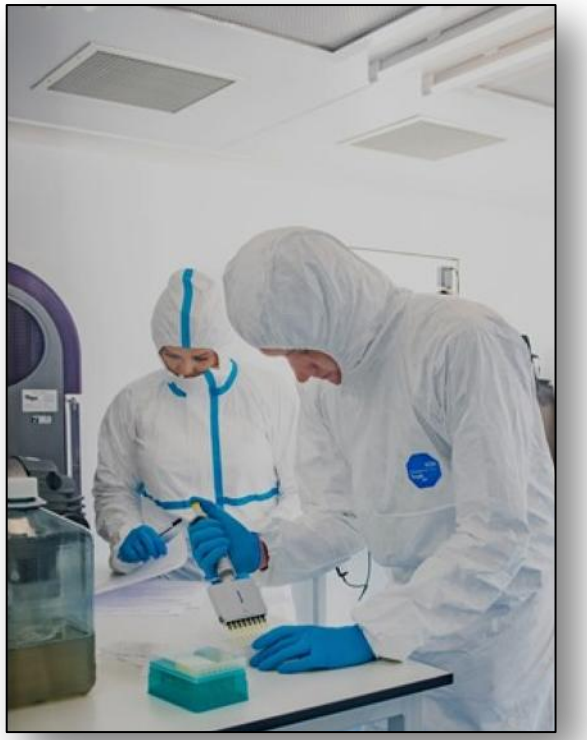
- Founded in 2015 by Prof. Andrew Mearns Spragg, a Scottish Marine Biotechnology pioneer
- UK based [Cardiff] – HQ and Manufacturing Facility
- Manufacturing to **ISO13485:2016**, high value purified Collagen Type-0 derived from jellyfish
- 14 employees

Jellagen is utilising the potential of marine biotechnology and state of the art engineering to deliver new collagen chemistry for medical and research applications.

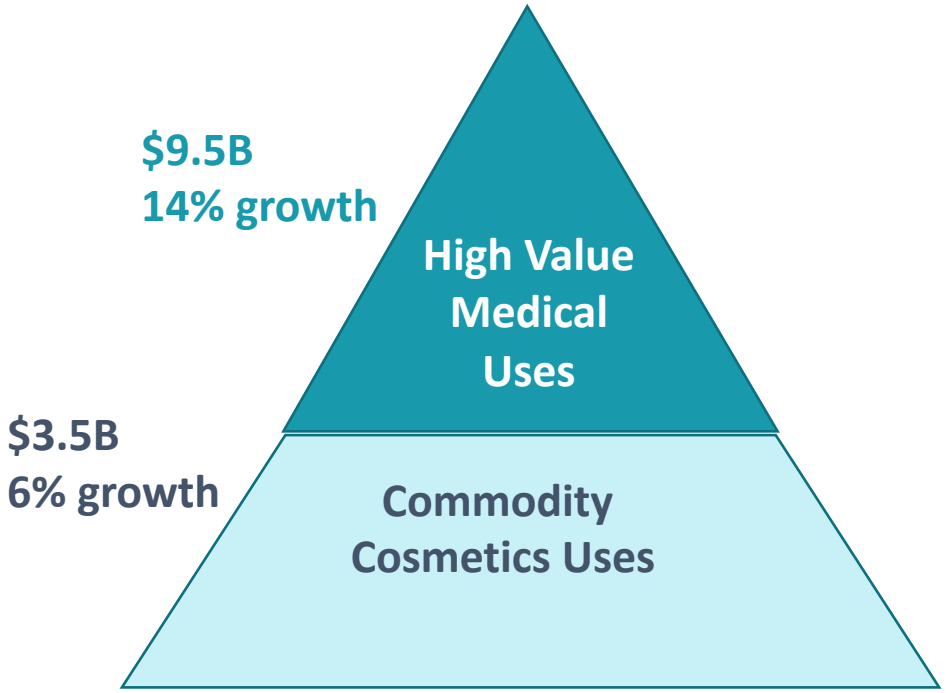


What is Collagen Type-0

Collagen Type-0: A stem collagen derived from Jellyfish. It is a chemistry innovation which acts as a breakthrough biomaterial offering compelling medical benefits.

Collagen Type-0: A Revolutionary new Biomaterial

- Evolutionary route of all collagens
- Biocompatible, Resorbable, Inert & Non-reactive
- Reduced interference at the miRNA level = improved cell:matrix interactions
- New mode of action of specific up/down of tissue regenerative genes
- Promotion of tissue vascularisation & neogenesis
- Non-mammalian and natural (prion / disease-vector free): Batch to batch consistent



Collagen Type-0

Collagen type-0 is Collagen

R.Pulmo collagen (Jellagen®)	Mammalian collagen
2α1 chains, 1α2 chain	2α1 chains, 1α2 chain
Tm = 28.9 °C	Tm = 33 °C
High biocompatibility	High biocompatibility
Focal adhesion development	Focal adhesion development
High bio sustainability	Low bio sustainability
Less hydroxyproline content	Normal hydroxyproline content

Comparison to Type I research grade collagen sources

Jellyfish collagen shares homology to human/mammalian Type I collagen and shares sequence homology to Type II, III, V & IX

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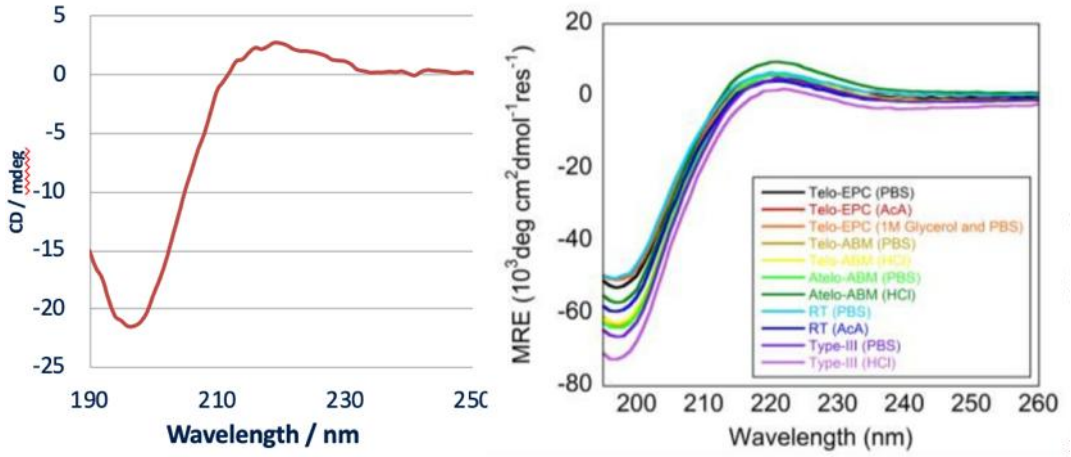
Collagen Type-0

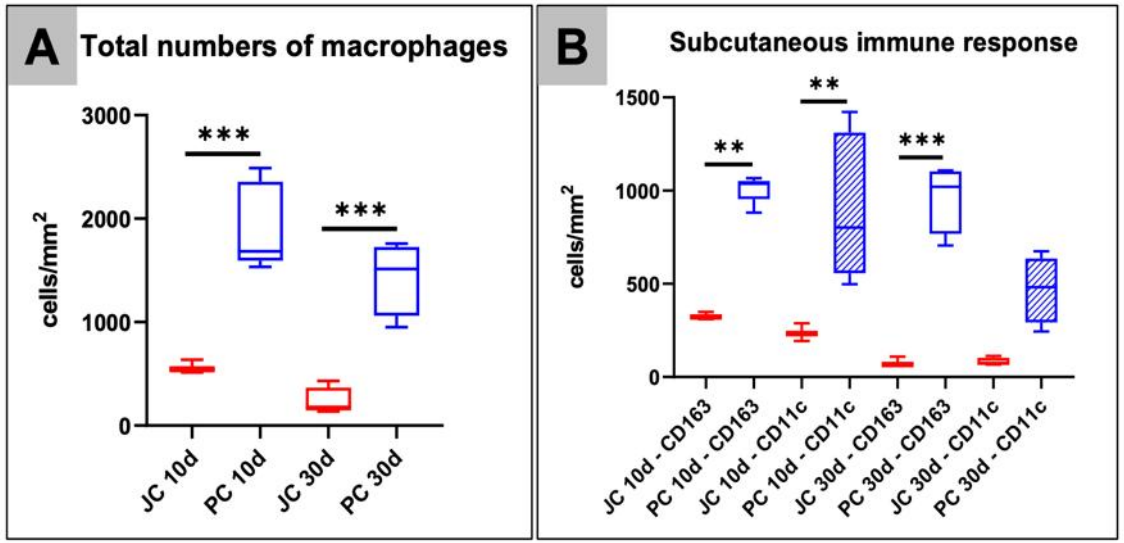
With a structure equivalent to collagen's triple helix, Collagen Type-0 has a lower immune response to mammalian collagen Type-1

Collagen Type-0 | Collagen Type I



The circular dichroism spectra of Type-0 material (left) compared to standard mammalian collagen Type-I samples (right).

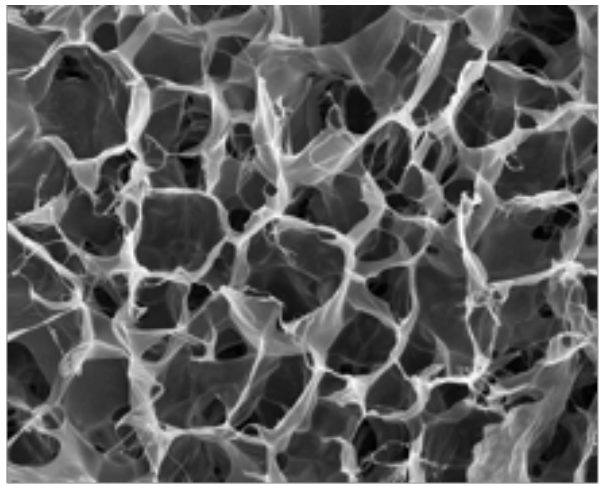
Both spectra show positive bands at approx. 220nm and negative bands at approx. 195nm, the distinct CD transitions associated with the secondary triple helix structure of collagen.

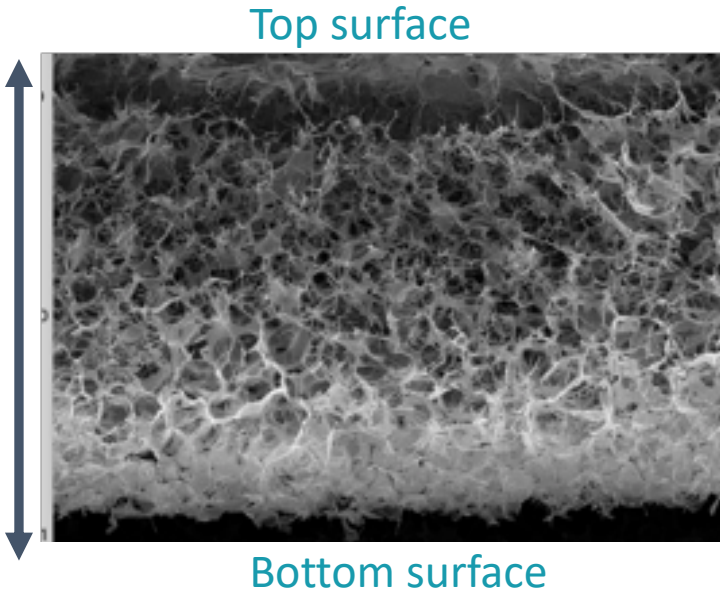


Histomorphometrical analysis of the **(A)** total occurrence of macrophages and (B) of the CD163- and CD11c-positive macrophages after implantation of collagen Type-0 (JC) and collagen Type 1 (porcine) (PC) within the subcutaneous connective tissue **(Flaig. I, *et. al.* 2020)**

Collagen Type-0

Collagen Type-0 scaffolds demonstrate a highly porous network suitable for medical / tissue engineering applications





Collagen Type-0 scaffolds:

- Are cross-linked to increase mechanical strength.
- Are moldable & bioresorbable over longer term

Collagen Type-0 scaffolds have a highly porous network which facilitate:

- Cell attachment,
- Cell proliferation, and
- Cell function
- Free flow of nutrients

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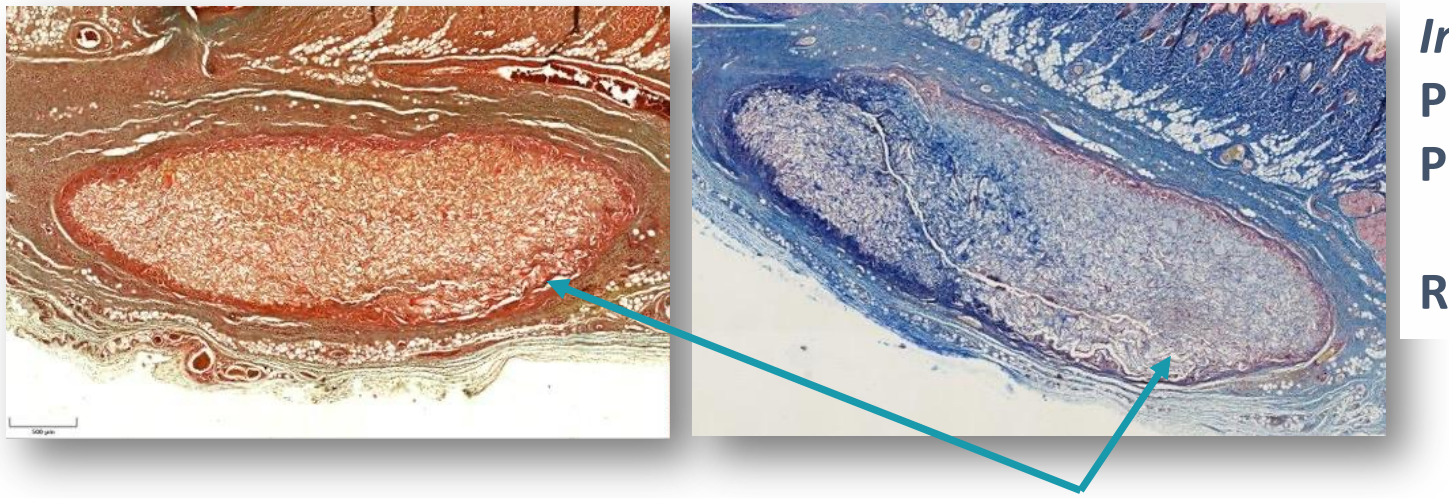
Implanted scaffolds show *In vivo* biocompatibility



Implanted Collagen Type--0 scaffolds within connective tissue

***In vivo* study:**	Mouse Calvarial implantation
Product Used:	Collagen Type-0 scaffolds
Positive control:	Collagen Type 1 porcine pericardium
Reference:	Flaig. I, *et. al.* 2020

Results:

- Collagen Type-0 scaffolds resorbed until day 60 after implantation
  - Process ended in a well-vascularized connective tissue.
- Collagen Type-0 induced a weaker immune response than to Type I porcine pericardium.
- Collagen Type-0 induced a long-term anti-inflammatory [M2] macrophage response resulting in optimal vascularization pattern
- Collagen Type-0 shows excellent biocompatibility and tissue/bone regenerative properties.

Current Products

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Versatile biomaterial enabling cell culture and tissue engineering applications

Research Grade Jellyfish Collagen

Product Information

Liquid collagen for **general cell culture**, either as a **direct substrate** or as a **coating material**.

Collagen Coated Plates

Product Information

Cultureware plates coated in Jellagen, for general **cell proliferation** and **2D cell culture.**

3D Scaffolds

Product Information

Collagen 3D Scaffolds (sponges) for **tissue engineering** and **3D cell culture.**

JellaGel™

Product Information

Collagen hydrogel for *in vitro* **3D cell culture** and **tissue engineering** applications.

Marine Type-0 Collagen

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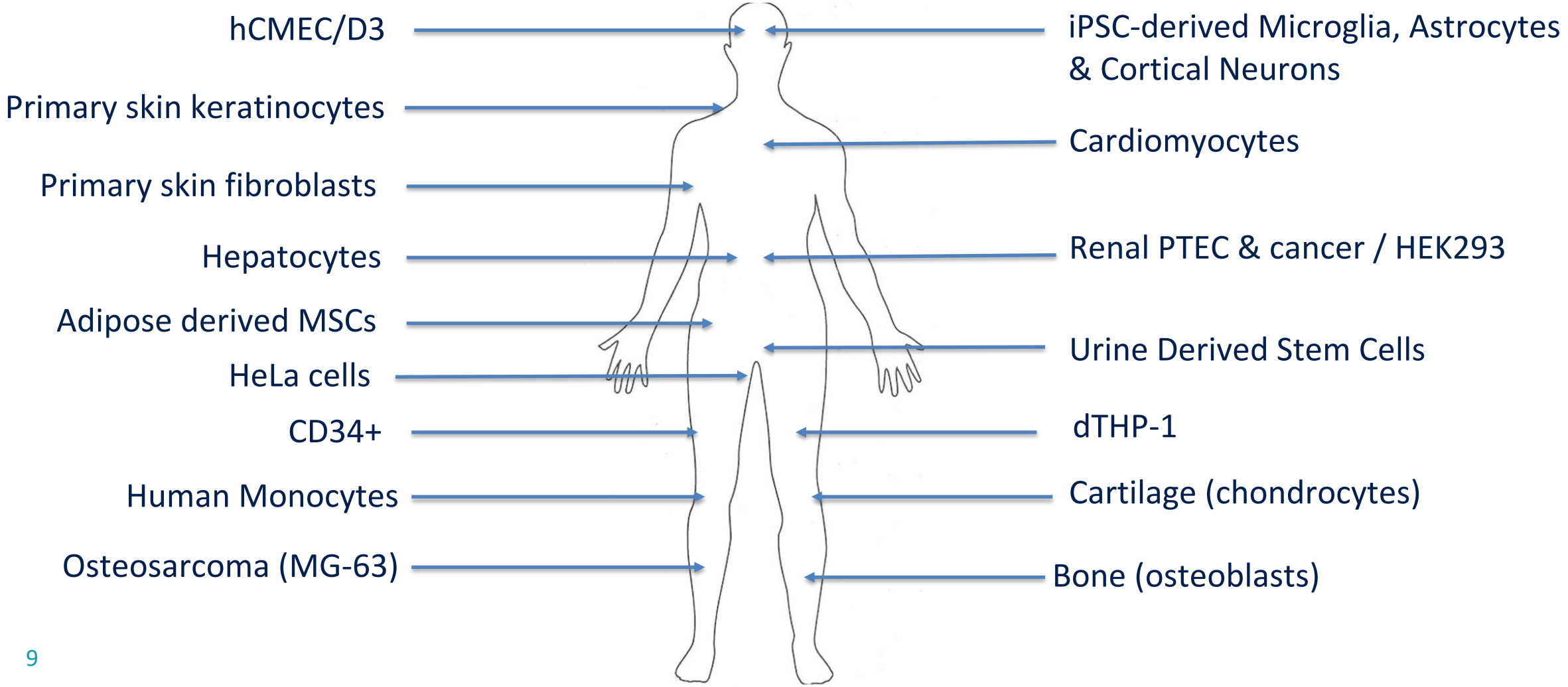
The following cell types have successfully been cultured *in vitro* on Jellagen



Market moving towards culturing cells in 3D

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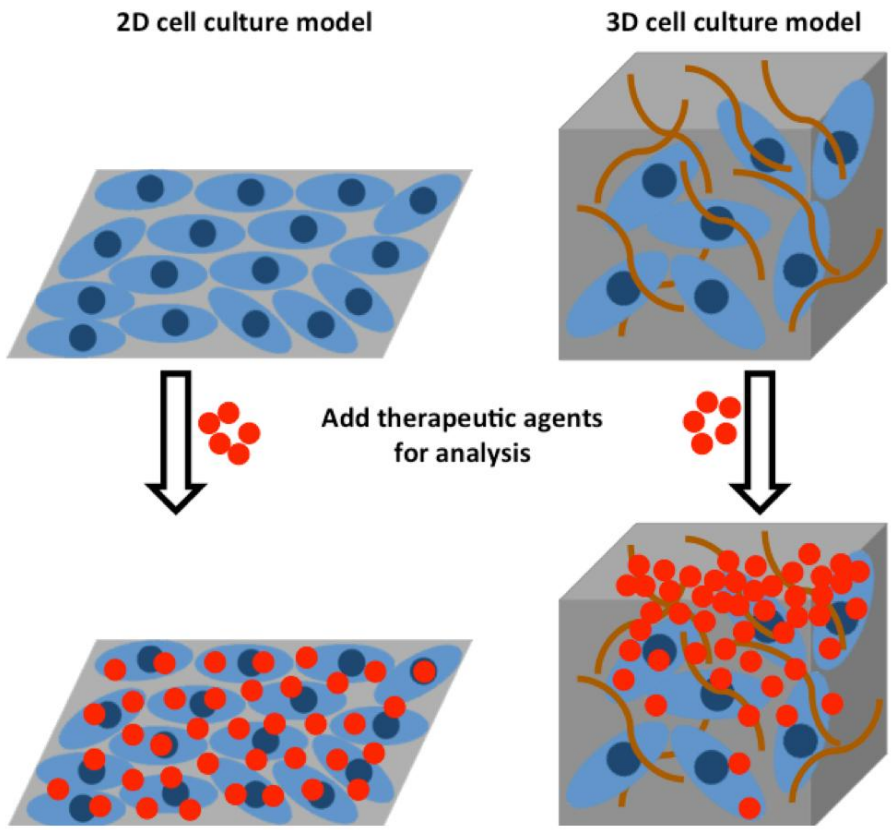
Biomimetic platforms enable *in vivo* "like" microenvironment



- Substrates mimic the natural extracellular matrix
- Mimic the *in vivo* microenvironment, as well as cell-cell and cell-matrix interactions
- Enable the assessment of tissue penetration ability and bystander killing efficiency of drugs, as well as the drug resistance of cells.
- Low design-in vitro-in vivo-redesign requirement: reduce overall cost for the pre-clinical in vivo test

Introducing JellaGel™

A simple to use 3D cell culture platform

1. **Easy to use**. Can be formulated into a self-sustaining, cell-laden hydrogel at room temperature using our new JellaGel hydrogel kit
2. **Biochemically simple**. No unwanted/undefined growth factors or biological contaminants that could negatively influence the culture of cells
3. **Versatile**. Although biochemically simple, other biological agents (e.g. growth factors) can be added to JellaGel to provide a specific biological response (e.g. differentiation).
4. **Batch-to-batch consistent**.
5. **Phenol red-free**. removing potentially undesirable biochemical effects.

Distributor network

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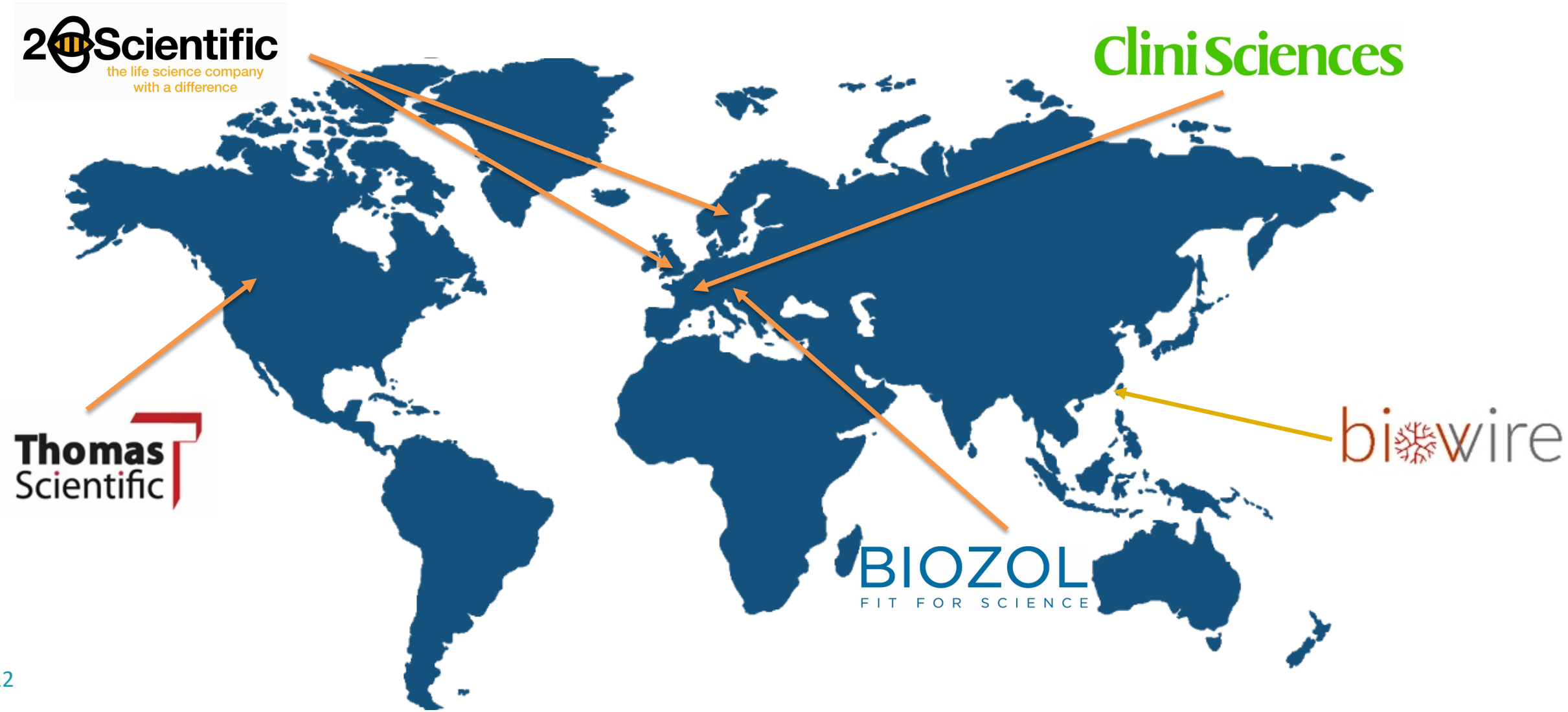
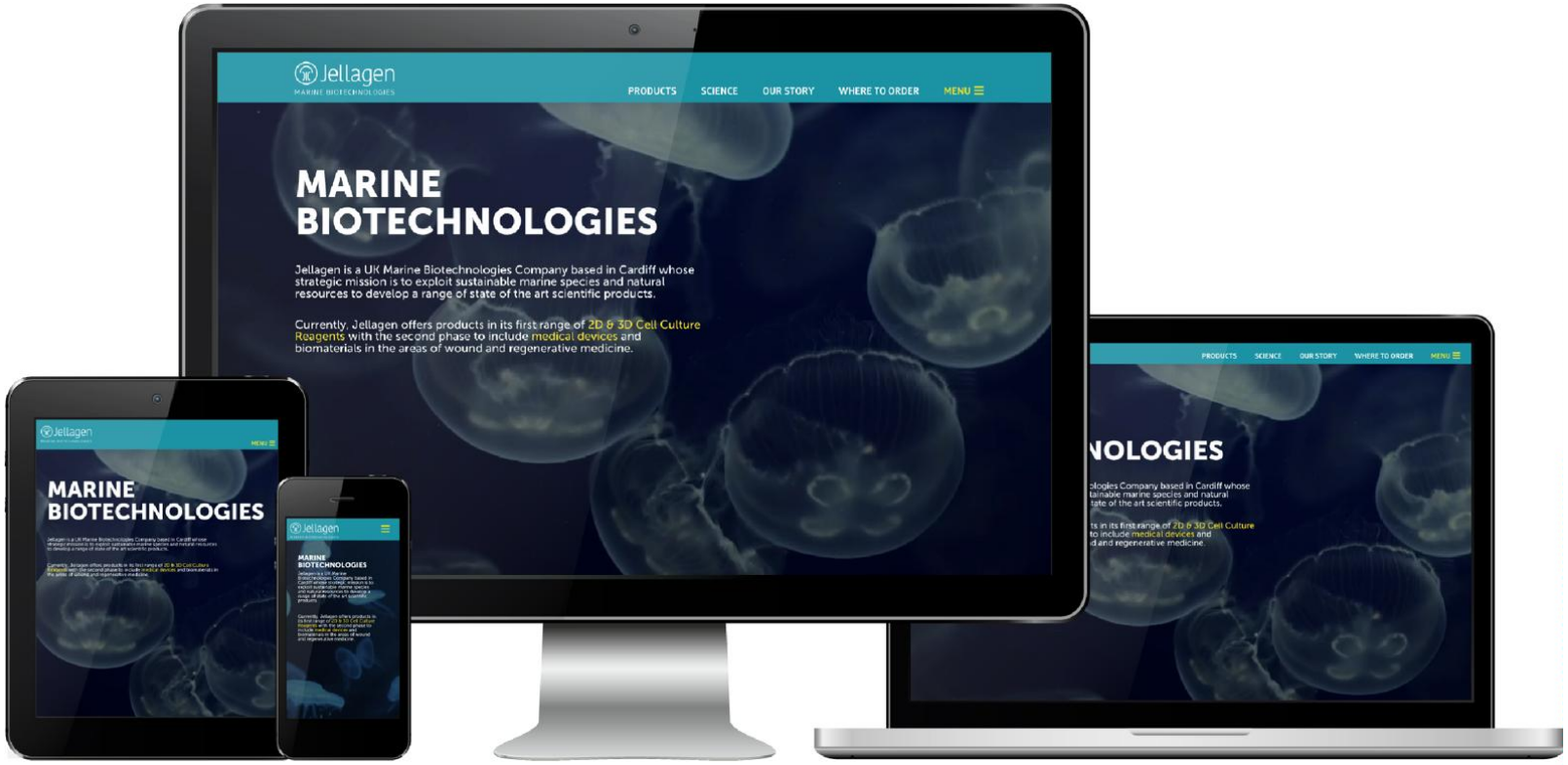
Global presence



Digital Presence



Thank you

www.jellagen.co.uk

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