FAQ: µCollaFibR™ Additive

1. What is the difference between 3DBioFibR's dry-spinning technology vs wet-spinning and electrospinning?

Strength profile – With our patented dry-spinning technology we can make fibers that have an ultimate tensile strength of about 248 megapascals, which is 2 to 3 times stronger than a native tendon. In electrospinning the use of volatile solvents and high shear forces denature the collagen proteins, limiting the mechanical and bioactivity features of the final fiber.

Scale – Wet spinning can only produce about 19m of a single fiber per hour and requires several square meters in the lab. In electrospinning the production rates are about 1000m per hour. With our dry spinning technology, we can readily produce 1000m a second in collagen fiber production.

Fiber Diameter – In the human body, collagen fibers typically measure between 1 and 5 microns in diameter. This dimension is critical for cell attachment, enabling the cell to wrap around the fiber and take directional cues. In wet spinning, the fibers have a diameter of 60 microns or more, diminishing the ability for cells to completely wrap around the material and take directional cues. Electrospinning produces fibers that are 0.2 microns or smaller, which is too fine for cells to rely on for their main structural environment. With our dry spinning technology, we can adjust the fiber diameter within the range of 0.2 to 20 microns. For tissue engineering applications, we have optimized the process to make fibers that are 1-5 microns in diameter, where we see excellent cell attachment, alignment, elongation, and migration.

2. What is the diameter of µCollaFibR™?

µCollaFibR™ is 1-2 micrometers in diameter in the dry state and 8-10 micrometers in diameter in the wet state.

3. What is the length of µCollaFibR™?

The average length of µCollaFibR is 44 ± 13 microns.

4. Which bioinks are compatible with µCollaFibR™?

Most common bioinks, including GelMA, alginate, agarose, and gelatin, are compatible with µCollaFibR.

5. Which solvents are compatible with µCollaFibR™?

µCollaFibR™ can be dispersed in water, buffered salt solutions e.g., PBS; weak acids (e.g., 10mM HCL, 20 mM AA) and most off-the-shelf bioinks including gelMA., alginate, agarose, and gelatin.

6. What is the stability of µCollaFibR™ in acidic conditions?

µCollaFibR is stable in 10mM HCl for up to 6 months.

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7. What is the recommended storage temperature for µCollaFibR™?
µCollaFibR™ is shipped at room temperature and once received, please store between 2-8℃ for short term storage for up to 3 months and -20℃ for longer term storage.

8. What is the maximum working temperature for µCollaFibR™?
The maximum temperature is below 60℃.

9. Can I buy fluorescent µCollaFibR™?
Yes, µCollaFibR can be purchased in both fluorescent and non-fluorescent formats.

10. What sterilization method is recommended for µCollaFibR™?
µCollaFibR™ is supplied in sterile packaging and is ready for use. Do not autoclave the product as it is not stable at temperatures above 60°C. Do not filter sterilize the product as the fibers are too large to pass through a filter.

11. What is the source of collagen used in µCollaFibR™?
Type I collagen sourced from Bovine hide (skin) manufactured in a GMP facility.

12. What cell types are compatible with µCollaFibR™?
µCollaFibR™ has been validated with a variety of cell lines including fibroblasts, myoblasts, epithelial cells, neural cells, and primary cells such as bone-marrow derived mesenchymal stem cells.