

# INSTRUCTIONS FOR USE

## CONTENTS

1. Introduction
2. Safety information
3. Product storage instructions
4. Mixing cells with GrowInk
5. Printing procedure
6. Printing tips and tricks
7. Ordering information
8. Contact information

GrowInk bioinks are for research use only and should not be used for diagnostic or therapeutic purposes.

## 1. INTRODUCTION

GrowInk™ bioinks have been specially designed for easy 3D printing. Our GrowInks are non-animal derived, biocompatible, nanofibrillar cellulose based hydrogels. GrowInks are supplied sterile, ready to use and are an excellent choice for a variety of bioprinting applications including, cell encapsulation, scaffold preparation for

tissue engineering regenerative medicine and drug delivery applications.

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## 2. SAFETY INFORMATION

In accordance with current regulations (1272/2008 CLP), GrowInk bioinks are classified as non-hazardous. The products consist of micro and nanosized cellulose fibrils (CAS/EC number 9004-34-6 / 232-674-9) and water (CAS number 732-18-5). The nanofibrillar cellulose is isolated from birch tree (*Betula* sp.). The products are provided sterile.

The products should be handled in accordance with good laboratory (GLP) and safety practices. Use protective gloves and clothes to avoid skin exposure. If exposed wash the skin with water. Use protective laboratory eye wear to avoid contact with the eyes. In its wet state the product does not form dust. If dried however, avoid breathing the dust. Dust filters are recommended.

### Description of first aid measures:

- Inhalation: Move to fresh air. Seek medical attention if symptoms appear.
- Skin contact: Rinse with water. Seek medical attention if irritation occurs.
- Eye contact: Rinse with plenty of water for several minutes. Seek medical attention if irritation occurs.
- Ingestion: Rinse mouth with plenty of water. If large quantities of the product are ingested endeavor to vomit. Seek medical attention if symptoms appear.

**NOTE:** For further information refer to the appropriate GrowInk Material Safety Data Sheets.

## 3. PRODUCT STORAGE INSTRUCTIONS

The expiration date of the GrowInk can be found on the product label and is normally 6 or 12 months from manufacture depending on the product. Please check the label carefully for the expiry date of your product. GrowInks should be stored as specified on the product label, normally 4–22°C (39–72°F) and protected from light for optimum performance. Please check the label carefully for the storage conditions of your product.

Once opened it is recommended that the product is stored at 4–8°C (39–46°F) for a maximum of 3 months. Ensure the cartridges are capped prior to storage to prevent drying.

**Do not store the product below 0°C (32°F) as freezing will result in destabilization of the product rendering it unusable.**

## 4. MIXING CELLS WITH GROWINK

- 1) The recommended protocol for mixing cells with GrowInks is as follows: Harvest the cells and count them, the recommended cell density is  $10^6$ – $10^8$  cells.
- 2) Mix the cell suspension with GrowInk in a ratio of 1:10. For example: mix 100  $\mu$ L of cell suspension in media with 1 mL of GrowInk.
- 3) Gently mix together until you obtain a homogeneous suspension.
- 4) Fill the cartridge with the mixed suspension, make sure all the contents go to the bottom of the cartridge. Avoid making air bubble formation in the suspension.

**NOTE:** GrowInks are supplied in cartridges, additional empty sterile cartridges can be purchased from our web store.

## 5. PRINTING PROCEDURE

**Printing with GrowInks is easy, just follow the steps:**

- 1) Insert the cartridge into the bioprinter.
- 2) Set your printing parameters based on your printer
- 3) Print

**If using a GrowInk that requires crosslinking, please note the following:**

- 1) After printing, pour the crosslinking solution over the entire final printed structure and wait 5 minutes (10 minutes for 5 cm structures).
- 2) Remove the crosslinking solution and replace it with the appropriate media. Change the media one more time after approximately 30 min.

## 6. PRINTING TIPS AND TRICKS

**For an optimal bioprinting experience please consider the following tips:**

- 1) Set the layer height to equal the inner nozzle diameter.
- 2) To minimize clogging risk, we recommend using nozzles 20 to 32-gauge diameter.
- 3) We recommend starting bioprinting tests by using the following parameters: pressure 10–30 kPa and speed 10–20 mm/s.

- 4) We recommend bioprinting with GrowInk at room temperature. When using a cell-GrowInk mixture printing can be carried out at maximum 37°C.
- 5) We recommend replacing the nozzle if bioprinting has been paused for over 10 minutes, GrowInk may have dried at the tip and clogged the nozzle.

**NOTE:** For more information on printing with GrowInks please see our application notes.

## 7. ORDERING INFORMATION

Contact us at [biomedicals.sales@upm.com](mailto:biomedicals.sales@upm.com) for a quotation or to place an order.

## 8. CONTACT INFORMATION

Additional information on all products and applications can be found on our website: [www.growdex.com](http://www.growdex.com)

Should you have any technical questions regarding this product or its intended use please go to [www.growdex.com/support](http://www.growdex.com/support), or contact us at:

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