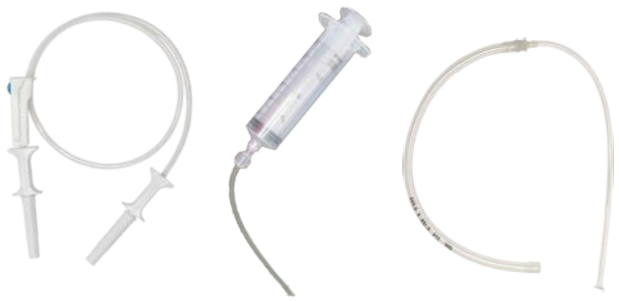
Filling Industry Gaps with Dedicated Cell & Gene Therapy Fluid Transfer Sets

by Dominic Clarke



OVERVIEW

Charter Medical's Advect™ Fluid Transfer Sets (FTS) are the only transfer sets that have been designed to support the global quality and manufacturing requirements of the CGT industry. They are intended for sterile transfer of bone marrow mononuclear cells from one container to another. Compared with alternative available products designed for other industries (i.e. blood transfusion), the new Advect™ FTS are medical devices designed to reduce regulatory hurdles and help facilitate seamless global technology transfer for clinical and commercial production of personalized medicines.

MEETING THE CHALLENGES OF CLINICAL AND COMMERCIAL MANUFACTURING

Cell and gene therapies (CGTs) have the promise and potential to not only treat, but potentially cure disease. Rapid growth in the cell therapy industry is driving demand in cellular manufacturing, and with that comes the increased need for quality, scalable components, and products to support the clinical and commercial therapeutic pipeline (1). While a wide variety of ancillary products, including single-use disposables, exist to support the cell therapy industry. Many have been designed for other industries and purposes resulting in cell therapy manufacturers having to adapt to pre-existing processes (2). Given the critical limitations that come with many autologous cell-based therapies, it is important to provide and implement products that will help to enhance quality, safety, and commercial viability.

Maintaining a Controlled Process

Delivery of cell-based products to the market presents unique risks in regard to the safety and efficacy of the final therapeutic, as well as the inherent challenges experienced throughout the manufacturing process. For CGTs, a controlled, robust, and reproducible manufacturing platform is essential to the manufacturer's success.

Many current personalized cell therapies advancing through clinical trials are highly manual in practice and require numerous ancillary components and handling steps. Component modifications within the process can impact the manufacturing process and ultimately the final product (3, 4).

Ancillary Material Quality for CGT Applications

The selection and use of ancillary materials is a vital quality component to consider when developing a manufacturing process for CGTs (3). Depending on the ancillary material and the intended use within the manufacturing process, quality aspects including biocompatibility, extractables and leachables, particulates, or cell recovery/ viability may be impacted (3-5). Early implementation of high quality materials with the appropriate components, testing, and supporting validation will help to mitigate potential risks (6). If available, FDA cleared medical devices are generally recommended due to the guarantee of appropriate supporting documentation and qualified, safe materials, thus providing a higher level of assurance (7).

Cleanroom-ready Packaging

Given that many CGTs are manufactured in cleanroom facilities, the packaging of ancillary products being introduced into these environments is very important. Packaging supports a number of aspects including physical protection, barrier protection, and handling or use. The packaging materials and configurations of the incoming products are significant considerations. Ideal packaging of the ancillary items entering the cleanroom will enable smooth transfer eliminating the need to perform excess handling and cleaning steps and reduce potential contaminants like particulates entering the production suite and final product.

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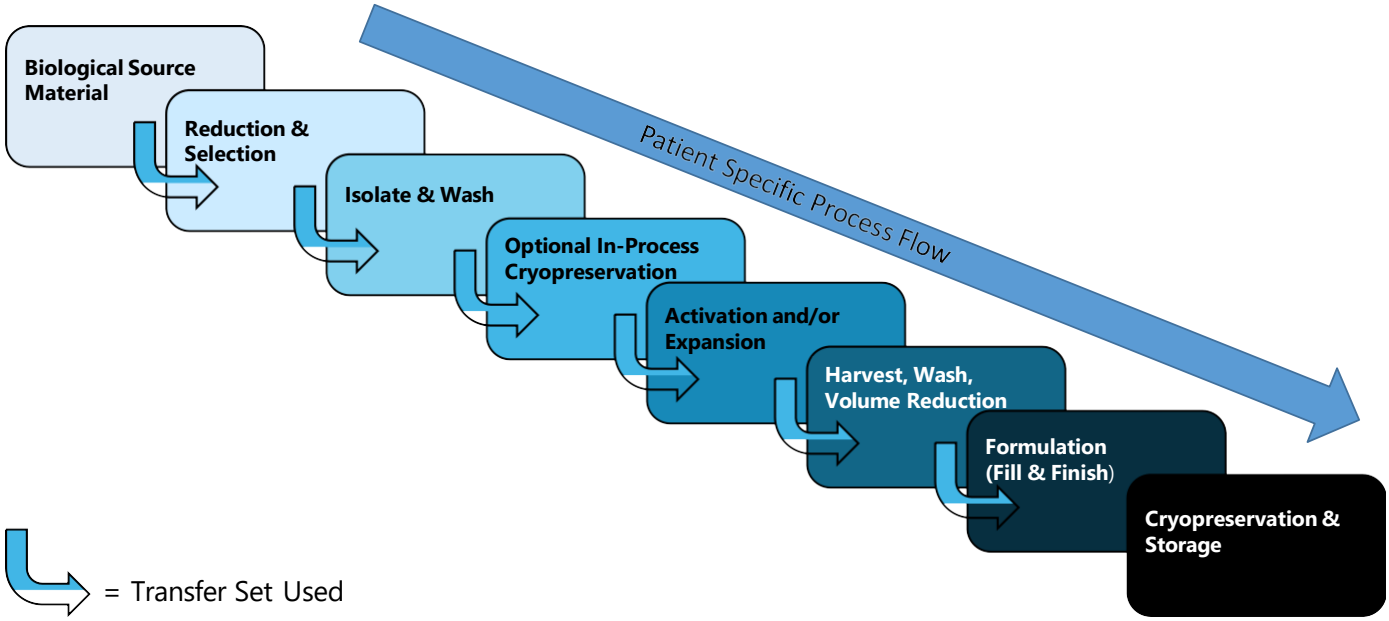
When processes begin to scale out, as part of late stage multicenter clinical trials across different regions for example, CGT manufacturers are often challenged

Figure 1: Typical CGT Process Flow



with varying regulatory compliance requirements (2, 6). Maintaining consistency of the manufacturing process and materials used is critical. This is important as regulatory requirements for cGMP compliance are not always interchangeable (e.g. components, testing, supporting documentation, availability) and can result in unnecessary delays.

Transfer Sets and Accessory Sets

As medical devices, transfer sets are most commonly associated with traditional blood transfusion applications. The starting material, techniques, and processes from many of the currently researched cell therapies originate from similar clinical settings. Therefore, a wide number of ancillary tools specifically developed to support the blood transfusion industry have been adopted into CGTs manufacturing protocols. Transfer sets, often referred to as accessory tubing sets, are used regularly within this field and have the potential to be used in nearly every step of the manufacturing process, as demonstrated in **Figure 1**.

These ancillary components are mainly used to transfer fluids or reagents from container to container, and are an especially critical component enabling CGT production. Given the usage frequency and the consideration that autologous CGT products are often limited to a single product per intended patient, transfer sets should be selected that provide the right components, performance and quality assurance. The current range of commercially available transfer sets or accessory sets were not designed for CGT manufacturing and therefore lack key industry requirements. Incorporation of transfer sets designed to support CGTs will aid in the implementation of controllable, consistent, and safe cGMP amenable manufacturing procedures.

CHARTER MEDICAL ADVECT™ FLUID TRANSFER SETS

Charter Medical has introduced a new family of fluid transfer set devices designed to support CGT applications. While alternative transfer set products are commonly used, industry deficiencies exist including component quality, testing, packaging, configurations and availability. The new Advect™ Fluid Transfer Sets offered by Charter Medical are intended for sterile transfer of bone marrow mononuclear cells from one container to another.

Table 1: Cell and Gene Therapy Industry Needs for Ancillary Products

Manufacturing Requirements	Advect™ FTS
Designed for cell and gene therapy	Yes
Reduce regulatory requirements	Yes
Support scale-out and technology transfer	Yes
Cleanroom amenable packaging	Yes
Not manufactured with DEHP	Yes
Cell-based compatibility	Yes
Reduce risk of particulate contamination	Yes
Standard product line offering	Yes

Table 1 outlines some of the specific cell therapy manufacturing requirements the new cell therapy transfer sets have addressed. In addition to using components not manufactured with DEHP (Bis(2-ethylhexyl) Phthalate), final product designs have been tested and validated to support industry requirements for cell-based compatibility and control of particulate levels. As previously noted,

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traditional transfer set products were designed for blood transfusion applications where cleanroom manufacturing is not performed. The new Advect™ sets are provided with pouching and packaging specifically suited for cleanroom manufacturing. As FDA 510(k) cleared and CE marked medical devices with supportive testing and validation, the quality and availability of these products reduce or eliminate potential challenges faced in the technology transfer procedure. The availability of these units bridge international needs for cell therapy manufacturing throughout multiple manufacturing sites and regions.

Charter Medical's Advect™ Fluid Transfer Sets are the only transfer sets designed to support the global quality and manufacturing requirements within the cell and gene therapy industry.

ABOUT CHARTER MEDICAL

Charter Medical helps produce safe and effective medicines by designing and manufacturing innovate, smart single-use solutions for the regenerative medicine, bioprocessing, and clinical markets. Charter Medical is a wholly owned subsidiary of Fenner PLC (LSE:FENR) and operates out of an ISO 13485 certified and FDA registered manufacturing facility in Winston-Salem, NC. To learn more, visit http://www.chartermedical.com.

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