



## Recombinant Human Interleukin-2 (rHu IL-2) Closed System Solutions™ (CSS)

Bags (1 MIU) Cat. # AR1045-0010 | Bags (2 MIU) Cat. # AR1045-0020 | Protein Concentration (10 µg/mL)  
Bags (7.5 MIU) Cat. # AR1050-0010 | Bags (15 MIU) Cat. # AR1050-0020 | Protein Concentration (75 µg/mL)

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### Product Description:

Akron's Recombinant Human Interleukin-2 (rHu IL-2) Closed System Solutions™ (CSS) is manufactured following all relevant cGMP guidelines for ancillary materials. The rHu IL-2 active substance is supported by a Type II Master File (MF) on file with the FDA and an MF Type I on file with Health Canada, which can be referenced during your drug or biologic application process.

Our rHu IL-2 amino acid sequence is identical to Proleukin® (aldesleukin), and its functional similarity in T Cell expansion has been evaluated and confirmed (see page 4). Akron's rHu IL-2 is a single chain, 15.3 kDa, non-glycosylated lymphokine analog expressed in *E. coli*, containing 133 amino acids. The downstream purification process uses a multi-step orthogonal approach, without the use of affinity tags, to minimize exogenous impurities and ensure the delivery of highly purified and active substance for further manufacturing applications.

*In vivo*, IL-2 plays a major role in both upregulating and downregulating the body's immune response. It is critical for the homeostasis and differentiation of many immune cell types and is involved in the immune system's ability for self-tolerance. The pleiotropic nature of cytokines is especially diverse in IL-2 due to its signal being transduced by at least three different primary signaling pathways. The trimeric IL-2 receptor protein (IL-2R) shares an identical subunit with the IL-7, IL-15, and IL-21 receptor proteins and activates some of the same signal transduction mechanisms. Akron's cGMP-compliant rHu IL-2 can be used to promote the *ex vivo* activation and proliferation of numerous immune cell types, including CAR-T cells, TCR-T cells, Tregs, TILs, NK cells, CIK cells, B cells, monocytes, and macrophages.

The liquid rHu IL-2 CSS product is packaged in a sterile fluoropolymer bag with two different weldable tubing connection options, allowing for easy incorporation into modern closed-system cell culture bioprocessing protocols. rHu IL-2 CSS increases safety and ease of use by eliminating the reconstitution step during manufacture and allows for the introduction of cytokine material into culture media in a fully contained manner to maximize sterility. Sterile filtration and aseptic filling are followed by Endotoxin and Sterility testing performed per USP/EP on the final product. See product Packaging features below.

### Product Features:

#### Active Substance

- Amino acid sequence identical to Proleukin® / aldesleukin
- Type II eCTD MF (#026152) on file with FDA and MF Type I (#e250089) on file with Health Canada
- Carrier protein-free liquid formulation
- All raw materials are compliant, controlled, and traceable under Akron's Quality Management System (QMS)



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### Manufacturing

- Multi-step downstream purification strategy excluding affinity tags
- Commercial-scale production capacity
- Sterile filtration and aseptic filling

### Packaging

- Sterile bag chamber – 8-mil fluoropolymer film providing inert bio-compatibility, structural integrity, and minimal gas transmission
- Two-part tube weldable tube - top 6" portion made from TPE AdvantaFlex® (1/8" ID x 1/4" OD), and the bottom 6" portion made from standard weldable PVC (3/32" ID x 5/32" OD)
- All primary packaging is plasticizer free
- Primary packaging materials extensively validated, controlled, and qualified to ensure a consistent experience
- Every bag packed in individual protective cassette and shipped in validated CSafe Parcel insulated shipper

### Quality

- USP <1043>, Ancillary Materials for Cell, Gene, and Tissue-Engineered Products
  - EP 5.2.12, Raw Materials of Biological Origin for the Production of Cell-based and Gene Therapy Medicinal Products
  - ISO 13485:2016, Medical Devices - Quality Management Systems - Requirements for Regulatory Purposes
  - ISO/TS 20399-1-3:2018, Biotechnology - Ancillary Materials Present during the Production of Cellular Therapeutic Products



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### Release Testing:

- Appearance (visual inspection)
- pH (potentiometric)
- Molecular Weight (reducing SDS-PAGE)
- Impurities (reducing SDS-PAGE)
- Impurities (non-reducing SDS-PAGE)
- Biological Activity (HT-2 cell proliferation)
- Bacterial Endotoxins (USP <85>/ EP 2.6.14)
- Sterility (USP <71>/ EP 2.6.1)

### Stability:

- Under long-term stability program
- Store at 2-8 °C
- Transport with cold packs
- Do not freeze

### Methods of Use:

There are two different options available for connecting to and extracting the liquid solution from Akron's rHu IL-2 CSS product (for full instructions, see "Methods of Use" document):

- 1) Weldable connection via top TPE AdvantaFlex® section (1/8" ID x 1/4" OD)
- 2) Weldable connection via bottom PVC section (3/32" ID x 5/32" OD)

### For Use Statement:

For research use or further manufacturing use in *ex vivo* cell therapy applications. This product is not intended for direct *in vivo* use or for direct clinical use as a drug, therapeutic, biologic, or medical device.

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## Related Products:

Catalog Number	Product Name	Size
AR1048-0100	Human AB Serum CSS, Converted from Octaplas®	100 mL
AR1037-0100	Human Serum Albumin (HSA) Closed System Solutions™ (CSS)	100 mL
AK9842-0040	Recombinant Human Interleukin-7 (rHu IL-7)	40 µg
AK9823-0040	Recombinant Human Interleukin-15 (rHu IL-15)	40 µg
AK9833-0040	Recombinant Human Interleukin-21 (rHu IL-21)	40 µg
AK9995-0020	Recombinant Human Interleukin-12 (rHu IL-12)	20 µg
AK9999-0025	Recombinant Human Interleukin-18 (rHu IL-18)	25 µg

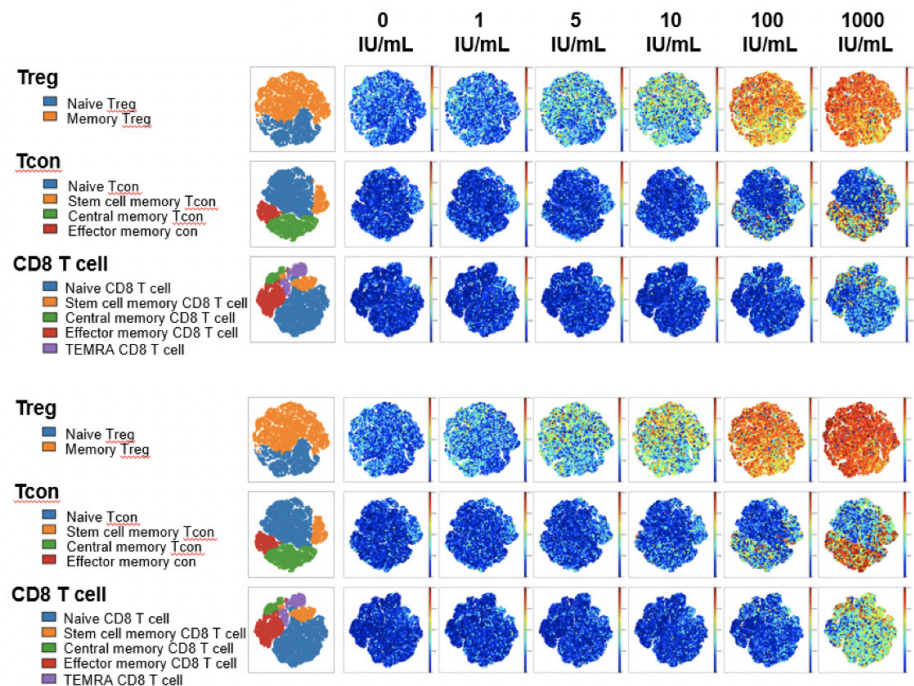
## Functionality Data:

### Akron rHu IL-2 vs Proleukin® - pSTAT5 Expression

Figure 1: To examine IL-2 signaling, freshly isolated PBMC from healthy donors were stained with surface antibodies targeting 21 different protein markers prior to in vitro stimulation with IL-2. Single mass cell cytometry was used to compare the effect of Akron's rHu IL-2 (above) against Proleukin® (below) on the expression of pSTAT5, pSTAT3, & pSTAT1 in T cell subsets. (pSTAT5 example shown to right).

When results were summarized for 6 healthy donors, T cell stimulation in vitro by Proleukin® and Akron rHu IL-2 were indistinguishable.

This study was done in collaboration with the Dana-Farber Cancer Institute; study and poster available upon request.



For more information on our available products or for technical assistance, see contact info below.  
 For contract orders under master supply agreement, please inquire.