

BI

BIOLOGICAL INDUSTRIES

DISSOCIATION SOLUTIONS FOR ADHERENT CELL CULTURE

Strategic portfolio of trypsin and alternative
cell dissociation products for all cell types.



CELL DISSOCIATION

Reliable trypsin and cell dissociation reagents for adherent cell culture

Biological Industries' trypsin and cell dissociation solutions are widely used for removing adherent cells from a culture surface. Choosing the right dissociation reagent and concentration depends on the cell type as well as the age of the cells in culture. BI provides a wide variety of trypsin solutions, which are prepared from porcine parvovirus-tested and mycoplasma-tested materials, in addition to chemically-defined alternatives.

Recombinant Dissociation Solutions The best replacement for trypsin.

BI's Recombinant Trypsin Solutions are animal component-free, defined cell dissociation enzymes that replace porcine trypsin and avoid animal-related variability and contamination. Recombinant Trypsin Solutions are ideal for dissociating attachment-dependent cells in both serum-containing and serum-free conditions and can be directly substituted for trypsin without protocol changes. These solutions are also optimized for sensitive cell types, a critical characteristic in preventing harsh effects for downstream processing.

- **Less harmful** — protect your cells from contaminants
- **Easy to handle** — stable at room temperature
- **Defined** — switch from animal-derived products

Trypsin Solutions

Trypsin is available in a variety of formulations with or without EDTA. EDTA is a chelator that binds calcium and magnesium ions that may otherwise inhibit the trypsin activity, which then hydrolyzes and gains access to the intercellular bonds (cell-cell and/or cell-substrate bonds). BI's trypsin solutions are designed to gently dissociate cells from almost any support substrates.

Soybean Trypsin Inhibitor

Soybean Trypsin Inhibitor is an effective serum-free, xeno-free alternative to inactivating trypsin, plasmin, and plasma kallikrein for the crucial protection of cells from long-term exposure to trypsin. Soybean Trypsin Inhibitor is sensitive to heat, alkaline pH, and protein-precipitating compounds.

Why choose BI's cell dissociation products?

- **Comprehensive portfolio** — options for various cell types
- **Chemically-defined alternatives** — animal component-free
- **Scalable and customizable** — fits any workflow
- **Manufactured under cGMP** — high-quality, low-price

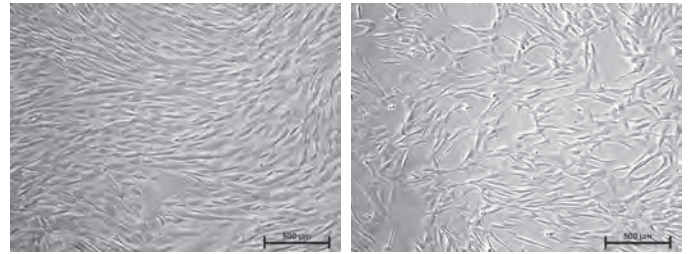


Figure 1. Comparison of Recombinant Trypsin and Trypsin Solutions. hMSC-AT 3 days post split. Cells were equally seeded (5000 cells/cm²) in NutriStem® MSC Medium. Cell recovery shown after dissociation with Recombinant Trypsin Solution (left), and Trypsin EDTA Solution C (right).

Accutase™ Solution

Accutase is a cell detachment solution of proteolytic and collagenolytic enzymes, and is useful for the routine detachment of cells from standard and adhesion-coated culture dishes as well as for gentle tissue dissociation. Accutase does not contain mammalian or bacterial-derived products.

Cell Dissociation Solution (non-enzymatic)

The Cell Dissociation Solution is a non-enzymatic, ready-to-use reagent designed for gently dislodging adherent cell types from tissue culture plates. The Cell Dissociation Solution is an alternative to enzyme-based dissociation solutions, maximizing the yield of functionally viable cells when used with serum-free or serum-containing media.

Choose your cell dissociation solution based on culture type

Cell type	Wash solution	Dissociation solution	Product Description	Cat. #
Strongly adherent cell lines	DPBS or HBSS w/o calcium and magnesium	Trypsin 0.25% w/o calcium and magnesium	<ul style="list-style-type: none"> Trypsin Solution B (0.25%) Trypsin Solution B (2.5%) (10X) 	03-046-1B 03-046-5B
Many cell types that may benefit from gentle solutions at early passages for improved viability	DPBS	Recombinant trypsin	<ul style="list-style-type: none"> Recombinant Trypsin EDTA Solution 	03-079-1B
Continuous cell lines that require maintenance of protein integrity at the cell surface	DPBS or HBSS w/o calcium and magnesium	Trypsin 0.05% in 0.53 mM EDTA	<ul style="list-style-type: none"> Trypsin EDTA Solution C (0.05%), EDTA (0.02%) 	03-053-1B
		Recombinant trypsin	<ul style="list-style-type: none"> Recombinant Trypsin Solution Recombinant Trypsin EDTA Solution 	03-078-1B 03-079-1B
Easily detachable cells, such as epithelial cells, with weak surface adherence	DPBS or HBSS w/o calcium and magnesium	EDTA/ Sodium Citrate	<ul style="list-style-type: none"> EDTA Disodium Salt Solution (0.05% in DPBS) Cell Dissociation Solution (non-enzymatic) 	03-015-1B 03-071-1B
Transformed fibroblasts	DPBS or HBSS w/o calcium and magnesium	Recombinant trypsin	<ul style="list-style-type: none"> Recombinant Trypsin EDTA Solution 	03-079-1B
Primary cells where cell surface protein integrity is important	DPBS or HBSS w/o calcium and magnesium	Recombinant trypsin	<ul style="list-style-type: none"> Recombinant Trypsin EDTA Solution 	03-079-1B
Strongly adherent cell lines in early passages	DPBS or HBSS w/o calcium and magnesium	Trypsin 0.25% in 1.3 mM EDTA	<ul style="list-style-type: none"> Trypsin EDTA Solution B (0.25%), EDTA (0.05%) 	03-052-1B
		Accutase Solution	<ul style="list-style-type: none"> Accutase Solution 	03-073-1B
Strongly adherent, epithelial and some tumor cell lines	0.5–1 mM EDTA	Trypsin 0.25% in 1.3 mM EDTA	<ul style="list-style-type: none"> Trypsin EDTA Solution B (0.25%), EDTA (0.05%) EDTA Disodium Salt Solution (0.05% in DPBS) 	03-052-1B 03-015-1B
		Accutase Solution	<ul style="list-style-type: none"> Accutase Solution 	03-073-1B
Highly confluent, multilayer cultures	1 mM EDTA	Trypsin 0.25% in 1.3 mM EDTA	<ul style="list-style-type: none"> Trypsin EDTA Solution B (0.25%), EDTA (0.05%) 	03-052-1B
All adherent cell cultures – manual dissociation	DPBS or HBSS w/o calcium and magnesium	Scraper or manual pipetting	-	

Enzyme-Free Passaging

Traditional methods for passaging hPSC cultures often involve the use of manual scraping of undifferentiated colonies or partial enzymatic dissociation of colonies into clumps using collagenase or dispase. This method is time-consuming, as extra care must be taken when working with enzymes to ensure that they are inactivated to prevent reduced attachment and poor survival of clumps.

BI's EDTA Solution helps avoid some of these challenges and increases cell viability post-passaging. The EDTA Solution is an enzyme-free, chemically defined, animal component-free concentrated dissociation solution which is suitable for the dissociation of hPSCs into cell aggregates for routine passaging or into a single-cell suspension.

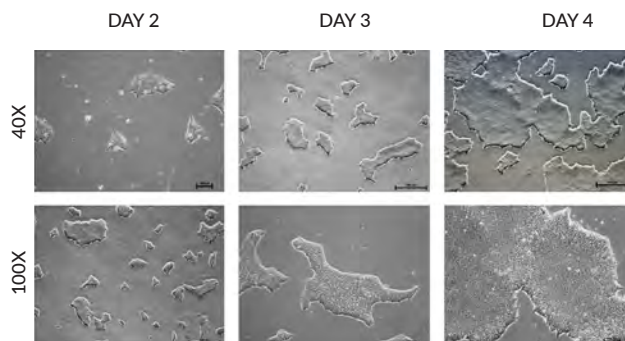


Figure 2. Typical recovery from enzyme-free passage using NutriStem® hPSC Medium on Matrigel. Representative results for colony morphology of H1 hESCs 2-4 days post-passage.

Single Cell Passaging

With the onset of cell manipulation, genetic editing, and CRISPR/Cas9 applications, single cell passaging is slowly on the rise. The use of completely dissociated single cell suspension for passaging generates a monolayer culture that has advantages of higher culture scalability, rapid expansion, and improved efficiency. The introduction of recombinant protein matrices and recombinant trypsin solutions, like BI's Recombinant Trypsin EDTA Solution, now enables the expansion of hPSCs in a monolayer. This allows for single cell passaging to be more efficient, viable, and simplistic to add to any protocol.

With the support of laminin-521, cells can be passaged in very low cell densities and can be cultured to high confluency without phenotypic alterations¹. Laminin-521 also supports efficient clonal culture and is an excellent substrate for iPSC reprogramming. When used with NutriStem® hPSC XF medium, laminin-521 has been proven to promote cellular survival and expansion of hPSCs after plating from single-cell suspension.

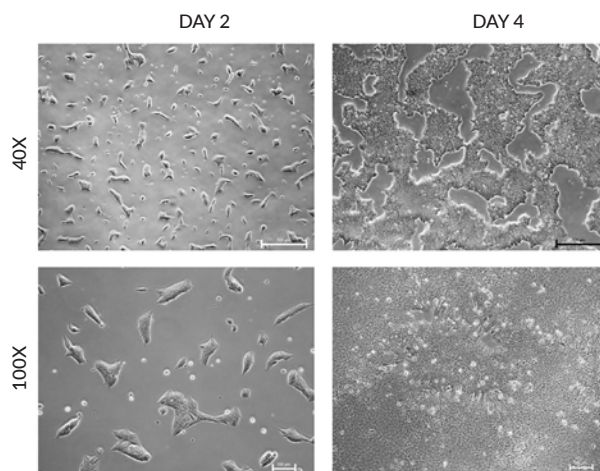


Figure 3. hESCs passaged as single cells at Day 0 (not shown) using Recombinant Trypsin EDTA and cultured on Laminin-521 in NutriStem® hPSC Medium. As shown, single cells have attached to the substrate 2 days post-passage (left), and have successfully proliferated 4 days post-passage (right).

References

1. Rodin, Sergey, et al. 2010. Long-Term Self-Renewal of Human Pluripotent Stem Cells on Human Recombinant Laminin-511. *Nature Biotechnology* 28 (6): 611-15.
2. Hubel, A. (2018) Cryopreservation of Human Adipose Stem Cells, in *Preservation of Cells: A Practical Manual*, John Wiley & Sons, Inc., Hoboken, NJ, USA. doi: 10.1002/9781118989883.oth4
3. Bajpai, R., et al. 2008. Efficient propagation of single cells accutase-dissociated human embryonic stem cells. *Mol Reprod Dev* 75: 818-827.
4. Zheng, K., et al. 2006. Comparison of different culture modes for long-term expansion of neural stem cells. *Cytotechnology* 52: 209-218.
5. Wachs, F.P., et al. 2003. High efficacy of clonal growth and expansion of adult neural stem cells. *Lab Invest.* 83: 949-962.
6. Loring, Jeanne Frances, and Suzanne Peterson. 2012. *Human Stem Cell Manual: A Laboratory Guide*. Academic Press.
7. Xu, C., et al.. 2001. Feeder-Free Growth of Undifferentiated Human Embryonic Stem Cells." *Nature Biotechnology.* 19 (10): 971-74.

Cell Dissociation Solutions

ORDER INFORMATION

PRODUCT	SIZE	CAT. #
Recombinant Trypsin Solution	100 mL	03-078-1B
Recombinant Trypsin EDTA Solution	100 mL	03-079-1B
Soybean Trypsin Inhibitor (50X)	20 mL	03-048-1C
Trypsin EDTA Solution A (0.25%), EDTA (0.02%), phenol red	100 mL	03-050-1B
Trypsin EDTA Solution B (0.25%), EDTA (0.05%), phenol red	100 mL	03-052-1B
Trypsin EDTA Solution C (0.05%), EDTA (0.02%), phenol red	100 mL	03-053-1B
Trypsin EDTA Solution C (0.05%), EDTA (0.02%), no phenol red	100 mL	03-054-1B
Trypsin EDTA Solution C (0.5%), EDTA 0.2% (10X), no phenol red	100 mL	03-051-5B
Trypsin Solution A (0.25%), no phenol red	100 mL	03-045-1B
Trypsin Solution B (0.25%), no phenol red	100 mL	03-046-1B
Trypsin Solution B (2.5%) (10X), no phenol red	100 mL	03-046-5B
Accutase Solution	100 mL	03-073-1B
Cell Dissociation Solution (non-enzymatic)	100 mL	03-071-1B
EDTA Solution 0.5M	100 mL	01-862-1B
EDTA Disodium Salt Solution (0.05% in DPBS)	100 mL	03-015-1B

To place an order in the US, contact Biological Industries USA at: tel: 860-316-2702; fax: 860-269-0596; email: orders@bioindusa.com.

Outside the US, contact your local distributor.



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