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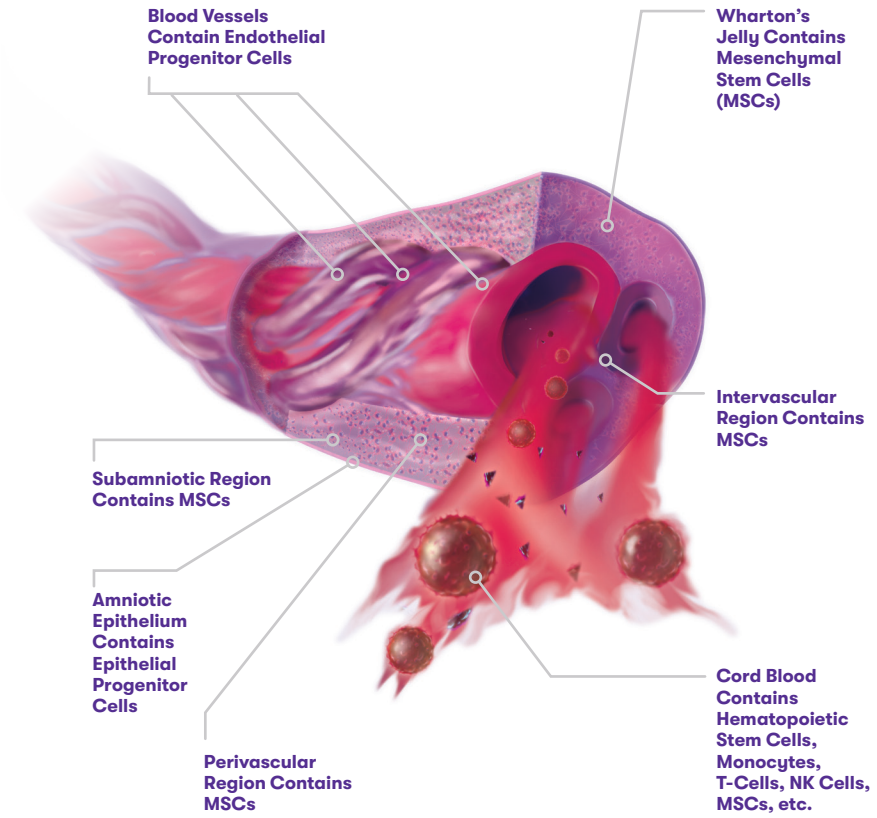
Newborn stem cells in regenerative medicine

Regenerative medicine is an area of medicine that aims to replace or regenerate cells, tissues, or organs to help restore function to the body.[1] Cell-based therapies using multiple cell types found in umbilical **cord blood and cord tissue** show promise as tools in this field and may be one of the next breakthroughs in healthcare.

- Newborn stem cells have demonstrated the ability to home to sites of injury in the body, regulate the body's immune response, reduce inflammation, and stimulate tissue repair via paracrine signaling.[2,3]
- In addition to the various cell types present in cord blood, CBR® cryopreserves whole cord tissue, providing clients with access to many cell types with potential therapeutic value.
- MSCs, like those found in cord tissue, are widely researched in regenerative medicine, and current research shows that there is also potential for the use of endothelial and epithelial cells in treating burns, wounds, vascular damage, and other conditions.[4,5]
- Over 500 clinical trials have been initiated to study the use of cord blood and cord tissue in experimental regenerative medicine applications for various indications.[6]



Examples of conditions being investigated in regenerative medicine[2,6,7]

● cord blood
● cord tissue

Neurological

Amyotrophic lateral sclerosis (ALS) ●
Alzheimer's Disease ●
Autism ●●
Cerebral Palsy ●●
Hypoxic ischemic encephalopathy (HIE) ●●
Parkinson's Disease ●●
Stroke ●●

Cardiovascular

Heart disease ●●
Hypoplastic left heart syndrome ●
Vascular damage ●●

Autoimmune

Lupus ●
Multiple Sclerosis (MS) ●●
Crohn's disease ●
Type 1 diabetes ●●

Tissue and organ damage

Bronchopulmonary dysplasia ●●
Burns and wound healing ●
Liver disease ●●
Lung disease ●
Premature ovarian insufficiency ●

Orthopedic

Cartilage and bone repair ●●
Osteoarthritis ●●
Spinal cord injury ●●

Newborn stem cells in transplant medicine

by CooperSurgical®

Current established treatments using **cord blood** stem cells as part of a stem cell transplant to rebuild healthy blood and immune systems:[8]

Blood disorders

- Acute Myelofibrosis
- Agnogenic Myeloid Metaplasia (Myelofibrosis)
- Amyloidosis
- Aplastic Anemia (Severe)
- Beta Thalassemia Major
- Blackfan-Diamond Anemia
- Congenital Amegakaryocytic Thrombocytopenia (CAT)
- Congenital Cytopenia
- Congenital Dyserythropoietic Anemia
- Dyskeratosis Congenita
- Essential Thrombocythemia
- Fanconi Anemia
- Glanzmann's Thrombasthenia
- Myelodysplastic Syndrome
- Paroxysmal Nocturnal Hemoglobinuria (PNH)
- Polycythemia Vera
- Pure Red Cell Aplasia
- Refractory Anemia with Excess Blasts (RAEB)
- Refractory Anemia with Excess Blasts in Transition (RAEB-T)
- Refractory Anemia with Ringed Sideroblasts (RARS)
- Shwachman-Diamond Syndrome
- Sickle Cell Disease

Cancers

- Acute Biphenotypic Leukemia
- Acute Lymphocytic Leukemia (ALL)
- Acute Myelogenous Leukemia (AML)
- Acute Undifferentiated Leukemia
- Adult T Cell Leukemia/Lymphoma
- Chronic Active Epstein Barr
- Chronic Lymphocytic Leukemia (CLL)
- Chronic Myelogenous Leukemia (CML)
- Ewing Sarcoma
- Hodgkin's Lymphoma
- Juvenile Chronic Myelogenous Leukemia (JCML)
- Juvenile Myelomonocytic Leukemia (JMML)
- Myeloid/Natural Killer (NK) Cell Precursor Acute Leukemia
- Non-Hodgkin's Lymphoma
- Prolymphocytic Leukemia
- Plasma Cell Leukemia
- Chronic Myelomonocytic Leukemia (CMML)
- Leukocyte Adhesion Deficiency
- Multiple Myeloma
- Neuroblastoma
- Rhabdomyosarcoma
- Thymoma (Thymic Carcinoma)
- Waldenstrom's Macroglobulinemia
- Wilms Tumor

Immune disorders

- Adenosine Deaminase Deficiency (SCID)
- Bare Lymphocyte Syndrome (SCID)
- Chediak-Higashi Syndrome (SCID)
- Chronic Granulomatous Disease
- Congenital Neutropenia
- DiGeorge Syndrome
- Evans Syndrome
- Fucosidosis
- Hemophagocytic Lymphohistiocytosis (HLH)
- Hemophagocytosis Langerhans' Cell Histiocytosis (Histiocytosis X)
- IKK Gamma Deficiency (NEMO Deficiency)
- Immune Dysregulation, Polyendocrinopathy, Enteropathy, X-linked (IPEX) Syndrome
- Kostmann Syndrome (SCID)
- Myelokathexis
- Omenn Syndrome (SCID)
- Phosphorylase Deficiency (SCID)
- Purine Nucleoside (SCID)
- Reticular Dysgenesis (SCID)
- Severe Combined Immunodeficiency Diseases (SCID)
- Thymic Dysplasia
- Wiskott-Aldrich Syndrome
- X-linked Agammaglobulinemia
- X-Linked Lymphoproliferative Disorder
- X-Linked Hyper IgM Syndrome

Metabolic disorders

- Congenital Erythropoietic Porphyria (Gunther Disease)
- Gaucher Disease
- Hunter Syndrome (MPS-II)
- Hurler Syndrome (MPS-IH)
- Krabbe Disease
- Lesch-Nyhan Syndrome
- Mannosidosis
- Maroteaux-Lamy Syndrome (MPS-VI)
- Metachromatic Leukodystrophy
- Mucolipidosis II (I-cell Disease)
- Neuronal Ceroid Lipofuscinosis (Batten Disease)
- Niemann-Pick Disease
- Sandhoff Disease
- Sanfilippo Syndrome (MPS-III)
- Scheie Syndrome (MPS-IS)
- Sly Syndrome (MPS-VII)
- Tay Sachs
- Wolman Disease
- X-Linked Adrenoleukodystrophy

To learn more, call us at 1.888.CORD BLOOD (1.888.267.3256) or visit cordblood.com

References: 1. Regenerative Medicine. AABB. Retrieved from: https://www.aabb.org/news-resources/resources/cellular-therapies/facts-about-cellular-therapies/regenerative-medicine. 2. Torre P, Flores AI. Current Status and Future Prospects of Perinatal Stem Cells. Genes (Basel). 2020 Dec 23;12(1):6. doi: 10.3390/genes12010006. PMID: 33374593; PMCID: PMC7822425. 3. Fan, XL., Zhang, Y., Li, X. et al. Mechanisms underlying the protective effects of mesenchymal stem cell-based therapy. Cell. Mol. Life Sci. 77, 2771–2794 (2020). https://doi.org/10.1007/s00018-020-03454-6. 4. Saleh R, Reza HM. Short review on human umbilical cord lining epithelial cells and their potential clinical applications. Stem Cell Res Ther. 2017;8(1):222. Published 2017 Oct 10. doi:10.1186/s13287-017-0679-y. 5. Paschalaki KE, Randi AM. Recent Advances in Endothelial Colony Forming Cells Toward Their Use in Clinical Translation. Front Med (Lausanne). 2018;5:295. Published 2018 Oct 23. doi:10.3389/fmed.2018.00295. 6. U.S National Library of Medicine. ClinicalTrials.gov. Accessed October 21, 2022. https://clinicaltrials.gov/. 7. Couto PS, Bersenev A, Verter F. The first decade of advanced cell therapy clinical trials using perinatal cells (2005/2015). Regenerative Medicine. 2017;12(8):953-968. doi:10.2217/rme-2017-0066. 8. Mayani, H., Wagner, J.E. & Broxmeyer, H.E. Cord blood research, banking, and transplantation: achievements, challenges, and perspectives. Bone Marrow Transplant 55, 48–61 (2020). https://doi.org/10.1038/s41409-019-0546-9.

The use of cord blood is determined by the treating physician and is influenced by many factors, including the patient's medical condition, the characteristics of the sample, and whether the cord blood should come from the patient or an appropriately matched donor. Cord blood has established uses in transplant medicine; however, its use in regenerative medicine is still being researched. There is no guarantee that potential medical applications being studied in the laboratory or clinical trials will become available.

Cord tissue use is still in early research stages, and there is no guarantee that treatments using cord tissue will be available in the future. Cord tissue is stored whole. Additional processing prior to use will be required to extract and prepare any of the multiple cell types from cryopreserved cord tissue. Cbr Systems, Inc.'s activities for New York State residents are limited to collection of umbilical cord tissue and long-term storage of umbilical cord–derived stem cells. Cbr Systems, Inc.'s possession of a New York State license for such collection and long-term storage does not indicate approval or endorsement of possible future uses or future suitability of these cells.