

ADULT & NON-EMBRYONIC STEM CELL RESEARCH

Advances & Updates for January 2006

HIGHLIGHT OF THE MONTH –

Cord Blood Bill—Stem Cell Therapeutic and Research Act of 2005—Becomes Public Law

“President Bush on Tuesday signed legislation to establish a national databank of umbilical cord blood and bone marrow that would allow doctors to quickly find a match for patients who need a transplant.” — *Associated Press, December 20, 2005*

The Stem Cell Therapeutic and Research Act establishes a structure that can immediately begin collecting cord blood stem cell units and making them available to Americans suffering from a variety of diseases from blood cancers to neurological diseases. With the enactment of this bill, more patients currently waiting on cord blood stem cells will benefit right now and fewer will die waiting on cord blood.

ADVANCES IN HUMAN TREATMENTS USING ADULT STEM CELLS—

BRAIN INJURIES: Researchers treat brain injuries with marrow – “A unique clinical trial will gauge the safety and potential of treating children suffering traumatic brain injury with stem cells derived from their own bone marrow starting early 2006 at The University of Texas Medical School at Houston and Memorial Hermann Children's Hospital. The clinical trial is the first to apply stem cells to treat traumatic brain injury. It does not involve embryonic stem cells.” — *The University of Texas Medical School at Houston, January 1, 2006.*

HEART: Stem cells give hope to heart patients in Thailand – “A novel therapy that involves injecting stem cells culled from the patient's own blood into the heart try[s]... to regenerate ailing heart muscle. The two-hour procedure, which involves a patient's own adult stem cells, skirts the risk of rejection by the body and thorny ethical issues surrounding the use of embryonic stem cells.” — *Reuters Health, January 9, 2006*

THALASSEMIA: Gene therapy derived from bone marrow stem cells may treat two blood disorders; human trials near – “New York scientists have developed a stem cell-based gene therapy they say may cure two pervasive blood disorders, and the first round of human trials is expected to begin within six months... **Sickle cell disease and thalassemia** are related genetic disorders typified by encumbered red blood cells that are incapable of effectively transporting oxygen. Stem cells produced in the bone marrow are collected from patients after they have been given a medication to boost their production.” — *Newsday, December 27, 2005* [**A cure for Sickle Cell Anemia has also been obtained through cord blood stem cells.**]

AVANCEMENTS IN DRUG THERAPY: \$19 Million for another adult stem cell patient treatment – “Osiris is developing **therapeutic products from stem cells taken from adult bone marrow.** The cells, called mesenchymal stem cells, have shown the ability to regenerate damaged or diseased tissues in humans. The company is doing **early-stage human testing on a potential approach to replace damaged cells after a heart attack.** Osiris also this week won a key U.S. Food and Drug Administration approval designed to speed the development of new drugs to treat rare diseases. The company's lead product, **Prochymal [an adult stem cell treatment], is being developed to treat graft-versus-host disease, an autoimmune disorder affecting bone marrow transplants.** — *American City Business Journals Inc., December 21, 2005*

ADULT STEM CELLS TREAT PATIENTS; EMBRYONIC STEM CELLS & HUMAN CLONING TAKE ADVANTAGE OF PATIENT'S HOPES: “The new determination that the results of those [Korean embryonic stem cell and human cloning] experiments were largely falsified and that Hwang never obtained stem cells from cloned embryos discredits what had appeared to be one of the biggest scientific breakthroughs of the decade. **The deception means that the highly touted field of embryonic stem cell research is years behind where scientists thought it was.**” — *The Washington Post, January 10, 2006*

67 CURRENT HUMAN CLINICAL APPLICATIONS USING ADULT STEM CELLS*

ANEMIAS & OTHER BLOOD CONDITIONS:

- Sickle cell anemia
- Sideroblastic anemia
- Aplastic anemia
- Red cell aplasia (failure of red blood cell development)
- Amegakaryocytic thrombocytopenia
- Thalassemia (genetic [inherited] disorders all of which involve underproduction of hemoglobin)
- Primary amyloidosis (A disorder of plasma cells)
- Diamond blackfan anemia
- Fanconi's anemia
- Chronic Epstein-Barr infection (similar to Mono)

AUTO-IMMUNE DISEASES:

- Systemic lupus (auto-immune condition that can affect skin, heart, lungs, kidneys, joints, and nervous system)
- Sjogren's syndrome (autoimmune disease w/ symptoms similar to arthritis)
- Myasthenia (An autoimmune neuromuscular disorder)
- Autoimmune cytopenia
- Scleromyxedema (skin condition)
- Scleroderma (skin disorder)
- Crohn's disease (chronic inflammatory disease of the intestines)
- Behcet's disease
- Rheumatoid arthritis
- Juvenile arthritis
- Multiple sclerosis
- Polychondritis (chronic disorder of the cartilage)
- Systemic vasculitis (inflammation of the blood vessels)
- Alopecia universalis

CANCERS:

- Brain tumors—medulloblastoma and glioma
- Retinoblastoma (cancer)
- Ovarian cancer
- Skin cancer: Merkel cell carcinoma
- Testicular cancer
- Lymphoma
- Non-Hodgkin's lymphoma
- Hodgkin's lymphoma
- Acute lymphoblastic leukemia
- Acute myelogenous leukemia
- Chronic myelogenous leukemia
- Juvenile myelomonocytic leukemia
- Cancer of the lymph nodes: Angioimmunoblastic lymphadenopathy

- Multiple myeloma (cancer affecting white blood cells of the immune system)
- Myelodysplasia (bone marrow disorder)
- Breast cancer
- Neuroblastoma (childhood cancer of the nervous system)
- Renal cell carcinoma (cancer of the kidney)
- Soft tissue sarcoma (malignant tumor that begins in the muscle, fat, fibrous tissue, blood vessels)
- Various solid tumors
- Waldenstrom's macroglobulinemia (type of lymphoma)
- Hemophagocytic lymphohistiocytosis
- POEMS syndrome (osteosclerotic myeloma)
- Myelofibrosis

CARDIOVASCULAR:

- Acute Heart damage
- Chronic coronary artery disease

IMMUNODEFICIENCIES:

- Severe combined immunodeficiency syndrome
- X-linked lymphoproliferative syndrome
- X-linked hyper immunoglobulin M syndrome

NEURAL DEGENERATIVE DISEASES & INJURIES:

- Parkinson's disease
- Spinal cord injury
- Stroke damage

OCULAR:

- Corneal regeneration

WOUNDS & INJURIES:

- Limb gangrene
- Surface wound healing
- Jawbone replacement
- Skull bone repair

OTHER METABOLIC DISORDERS:

- Sandhoff disease (hereditary genetic disorder)
- Hurler's syndrome (hereditary genetic disorder)
- Osteogenesis imperfecta (bone/cartilage disorder)
- Krabbe Leukodystrophy (hereditary genetic disorder)
- Osteopetrosis (genetic bone disorder)
- Cerebral X-linked adrenoleukodystrophy

*** There are no current clinical trials in humans with embryonic stem cells:**

"It is nearly certain that the [human] clinical benefits of the [embryonic stem cell] research are years or decades away. This is a message that desperate families and patients will not want to hear."

— Science, June 17, 2005