ADULT & NON-EMBRYONIC STEM CELL RESEARCH

Advances & Updates for October – November 2005

HIGHLIGHT OF THE MONTH –

> ***"Cord blood is surprising researchers with previously unrecognized healing powers that go far beyond its known effectiveness against childhood leukemia and some other disorders. Early research in animals suggests that cord blood may provide a new bounty of cures and treatments for many other medical conditions, including heart attack, Parkinson's disease, stroke, Alzheimer's disease, muscular dystrophy, diabetes, spinal cord injury and amyotrophic lateral sclerosis****…In May, the New England Journal of Medicine published a study showing that* ***a cord blood transplant performed as soon as possible after birth can, for the first time, stop the deadly course of Krabbe disease [a fatal neurological condition in infants]."***
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> — *Chicago Tribune, October 23, 2005*

ADVANCES IN *HUMAN TREATMENTS* USING *ADULT STEM CELLS* –

CORD BLOOD: "A discovery by a team of University of Toronto bioengineers will boost the treatment of adults with blood-borne cancers through the use of umbilical cord blood. Umbilical cord blood can be used in place of bone marrow for transplants into patients with blood cancers." — *The Toronto Star, October 20, 2005* (**Cord blood has already been used to treat thousands of patients and this team hopes to move on to human clinical trials within a year.)**

BONE/CARTILAGE: "Using a protein that can seduce adult stem cells into becoming bone tissue, a researcher at the University of Toronto has pioneered a technique to reset the jaw's skeletal clock — **coaxing bones to grow as they do in a newborn baby**." — *The (Halifax) Chronicle Herald, October 31, 2005*

CANCER: "Queensland scientists have found a way to use stem cells extracted from bone marrow to **prevent relapses in recovering leukemia patients**." — *Australia Broadcasting Corporation News, October 14, 2005*

EYES: An improved treatment has been developed "taking stem cells from the eye of a dead human donor, growing them in a laboratory and then transplanting them on to the surface of the patient's eye. **The cells provide the spark for the patient's own cells to regenerate, effectively allowing the cornea to re-grow itself**." — *(London) Daily Mail, October 15, 2005*

HEART:

- Scientists from Germany report in the November 7, 2005 issue of the journal *Circulation* that **patients with heart damage showed improvement after injection of a protein that stimulated the patients' own bone marrow adult stem cells to move into their bloodstream and go to the heart.** — *Circulation, November 7, 2005*

- **Marrow cell preliminary trial offers encouragement for definitive tests of cardiac regeneration technique,** according to a new study in the Nov. 1, 2005, issue of the Journal of the American College of Cardiology, 18 patients given infusions of their own bone marrow stem cells **showed substantial improvement up to eight years after a heart attack**. — *EurekAlert!, October 26, 2005*

LIVER: Patients with liver failure have been successfully treated using their own bone marrow stem cells. Within a few months, three of the five patients showed normal liver function. — *The Scotsman, October 6, 2005*

WOUNDS/BURNS: Stem cell therapy enables patients' own body to repair damaged blood vessels and grow new ones thus restoring blood flow and oxygen to damaged tissue. — *PR News, October 10, 2005.*

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