

# Human Umbilical Cord Cells



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**Aurora BioSolutions Inc.** →  
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MEDICINE HAT, AB and TORONTO, May 1, 2019 /CNW/ - Aurora BioSolutions Inc. and Tissue Regeneration Therapeutics Inc. (TRT) announce they have discovered that human umbilical cord cells are a sustainable source of human butyrylcholinesterase (HuBChE), a bioscavenger that neutralizes organophosphate nerve toxins. Furthermore, the cells can be engineered to over-express this important enzyme. The work was released online in the journal *Chemico-Biological Interactions* on 22<sup>nd</sup> March and will appear in print on May 25, 2019.

Over 3 million cases of organophosphate poisoning from agricultural pesticides occur each year world-wide, and result in over 200,000 deaths per annum. Man-made organophosphate molecules are found in certain pesticides, nerve agents used in chemical warfare, and some drugs including cocaine. Intentional release of nerve agents as an act of war or terrorism, although uncommon, is an increasing threat associated with high mortality rates.

Despite 30 years of international research efforts, available treatments for organophosphate poisoning are insufficient for severe cases. Currently, life-saving HuBChE treatment costs \$20,000 USD/dose, with multiple doses required per day. HuBChE is normally found in human blood in microgram quantities and has proven to be a safe and effective antidote to nerve toxins when administered at thousand-fold higher milligram doses. Attempts to manufacture the enzyme outside the human body have been commercially unsuccessful, therefore available doses have been derived from expired blood bank products and are limited.

The research team at Aurora BioSolutions discovered that the mesenchymal stem/stromal cells (MSCs) derived from Wharton's jelly of human umbilical cords by TRT naturally synthesize biologically active HuBChE. Additionally, they were able to show that the cells could be engineered to increase HuBChE yields. Aurora BioSolutions' researchers completed the work under contract to the Casualty Management Section at Defence R&D Canada, Suffield Research Centre. Additional information is available at: [www.drdc-rddc.gc.ca](http://www.drdc-rddc.gc.ca)

"This discovery has life-saving implications" states Aurora BioSolutions' founder and chief scientist, Dr. Lorena Braid. "TRT's cell platform presents an important opportunity to manufacture not only natural HuBChE, but also functionally enhanced HuBChE variants using gene engineering strategies." Additional funding and strategic partners are now being sought to optimize and scale the system to generate clinically relevant doses of the antidote.

Dr. John E. Davies, CEO of TRT states, "While MSCs are being increasingly developed as cellular therapies for a wide range of indications in regenerative medicine, we know that MSCs sourced from different tissues have varying degrees of bioefficacy. Of particular importance, the Aurora BioSolutions team showed that MSCs derived from human bone marrow did not produce BChE, illustrating the unique advantage of umbilical cord derived cells for this application." HuBChE plasma levels are compromised in many systemic diseases including liver cirrhosis, diabetes and neurodegenerative conditions, indications that would also benefit from a HuBChE product.

The full research article, "Human umbilical cord perivascular cells: a novel source of the organophosphate antidote butyrylcholinesterase", can be accessed at: <https://authors.elsevier.com/a/1Yq3f272QK56>

### **About Aurora BioSolutions**

Aurora BioSolutions Inc. is a privately held company focused on developing MSC-based prophylactics and treatments that address capability gaps for military and civilian first responders. Additional information is available at: <http://www.aurorabiosolutions.com>

### **About TRT**

TRT is a Canadian Controlled Private Corporation with a focus on the commercial development of their patented Human Umbilical Cord PeriVascular Cell (HUCPVC) technology platforms that include culture expanded cells (TXP) and engineered cells (eTXP). The latter are designed for specific unmet needs, in addition to the constitutive advantages of TXP, by the engineered secretion of cytokines, growth factors or monoclonal antibodies for targeted therapies. Additional information is available at: <http://www.verypowerfulbiology.com>

SOURCE Aurora BioSolutions Inc.

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