Development of Anti Necrotic Drugs for Prevention (BGN)

Eli Lewis, of Clinical Biochemistry, Faculty of Health Sciences, Ben-Gurion University of the Negev
Ilana Nathan , Clinical Biochemistry, Faculty of Health Sciences, Ben-Gurion University of the Negev

Cell death can occur through two main mechanisms, apoptosis or necrosis. Apoptosis is a tightly regulated physiological process and many of the biochemical pathways involved are well characterized. Necrosis, the outcome of severe and acute injury, has been until lately generally viewed as an accidental pathological mode of cell death. Recently however, there is evidence that necrosis might be in fact a highly regulated process in which intrinsic cellular mechanisms such as inhibition of caspases (enzymes involved in apoptosis) and reduction of ATP activity can induce a switch between apoptotic and necrotic modes of cell death. Necrosis occurs as a consequence of dramatic perturbation of cellular metabolism or disruption of cellular structures resulting in marked inflammatory response due to the harmful cellular content. Clinically, necrotic cell death leads to severe, irreversible tissue damage followed by either ischemia, hypoxia or trauma and is the cause of in various severe conditions such as Persistent myocardial ischemia, brain injuries and CVA, as well as neurodegenerative diseases such as Alzheimer's, dementia and ALS, septic shock, liver cirrhosis, chronic hepatitis, pancreatitis, myonecrosis, diabetes mellitus, gangrene and chronic pressure ulcers and many others. No current effective and specific clinical treatment for necrosis is available, except for hyperbaric oxygen therapy. Several therapies which provide palliative support in pathologies associated with necrosis, such as early and aggressive surgical debridement, and administration of antibiotics, anti-inflammatory drugs and intravenous immunoglobulins (IVIg) do exist, however these treatments are applied with mixed success, the added risk of side effects and a height burden of cost.

Prevention of necrosis therefore is an important therapeutic challenge for the treatment of many pathological conditions and thus is the subject of broad research.

Our Solution

We have shown that certain existing drugs such as Elaspol (Sivelestat) used for chronic obstructive pulmonary disease (COPD) and Alpha-1 Antitrypsin (AAT) used as an enzyme replacing treatment for emphysema and chronic obstructive pulmonary disorder (COPD) in AAT-deficient patients, or drug candidates in the pipeline such as Humanin, a new peptide drug candidate shown to have a protective effect against Alzheimer's disease (AD) related apoptosis, can prevent necrotic cell death following in cell cultures and in animal models and therefore can be good candidates for anti necrotic treatment. Moreover these drugs when used in combination or with other drugs show a synergistic effect and thus might be used as a hifhly efficient combinational therapy of necrosis associated diseases.

Patent Status

Patent Pending

Contact for more information:

Ora Horovitz ✉, Senior VP. Business Development,

BGN Technologies Ltd. - Technology Transfer Company of Ben-Gurion University, POB 653, Beer-Sheva, 84105, Israel. Tel: +972-8-6236949 Fax: +972-8-627-6420