

**Contact:**

Harl Tolbert,
techtransfer@roswellpark.org,
716-845-4459
www.roswellpark.org/commercialization

Method for Prevention of Cell Death Under Hypoxic Conditions

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Keywords: HK-2, TACRI, Short Hairpin RNA (shRNA), Hypoxia Related Genes (HRGs), Ischemia, kidney.

Collaboration Research Opportunity: Roswell Park Cancer Institute is seeking partners to help co-develop methods for prophylaxis and therapy of hypoxia-associated conditions.

Summary: Hypoxia and decreased supply of nutrients are the hallmarks of kidney ischemia. Hypoxia and ischemia have been implicated in a host of human diseases, including cancer, heart disease, and neurological disorders. Additionally, organs and tissues which are obtained for transplantation frequently deteriorate due at least in part to hypoxia while being stored and transported for transplantation. Hypoxia accompanied by reduced availability of glucose is known to be toxic to a wide variety of cell types and tissues, and the fundamental biochemical processes affected by these conditions are likely to be relevant to ischemic response of multiple organs.

Technology: This invention is a method to extend survival of cells under hypoxic conditions. This includes the conditions of organ ischemia, by suppressing the function or the corresponding product of one or more genes from BCL2L14, BLOC1S2, C2ORF42, CPT1A, FBP1, GCNT3, RHOB, SCIN, TACR1, TNFAIP6. These genes are referred to as hypoxia related genes (HRG). The method is based on discovery of a number of these HRGs, whose functional suppression and/or loss of function results in increased survival of cells under hypoxic conditions.

Potential Commercial Applications:

- Identification of this therapeutic strategy would be an important step towards reducing morbidity and mortality associated with kidney failure.
- Fundamental biochemical processes affected by hypoxia likely to be relevant to ischemic response of multiple organs.
- Could be of importance in organs and tissues involved in transplants.

Competitive Advantages:

- Method of this invention can be used for prophylaxis and/or therapy of undesirable consequences of hypoxia.
- Validity of the method was demonstrated using a clinically relevant mouse model of acute kidney ischemia.
- Any combination or subcombinations of HRGs described can suppressed to achieve prophylaxis and/or therapy.

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Inventor: [Eugene Kandel, PhD](#)