# OPTIMIZED IMMUNOGENIC PEPTIDE FOR DUAL OXIDASES 2 (Duox2) ANTIBODIES DEVELOPMENT

Yun Ge[1*], YongZhong Wu[1,] Krishnendu Roy[2], and James Doroshow[1,2].

*[1]Laboratory of Molecular Pharmacology, Center for Cancer Research, [2]Division of Cancer Treatment and Diagnosis, National Cancer Institute, Bethesda, MD20892.*

**Email:gey@mail.nih.gov*

Abstract: In addition to the other cellular resources, reactive oxygen species (ROS) are generated specifically through the activity of the membrane-integrated nicotinamide dinucleotide phosphate (NADPH) oxidases (NOXs) and DUOXs have been shown as major contributory factors to the cancerous events. Although DUOXs have been shown to play important roles in carcinogenesis of thyroid and lung tissues, the high homology of DUOXs protein across mammalian species makes it quite a challenge for developing antibodies in the immune-detection of tumor origin. As a membrane integrated protein, expression of DUOX2 protein has been proved problematic in prokaryotic system. Hence, we introduced codon optimization procedure in the DUOX2 gene for the protein production in E-coli host. In this study, we optimized a 1221 base pair DNA segment to efficiently produce extracellular portion of DUOX2 as antigen. Modification of 15% nucleotides of the 1221 base pair DNA segment resulted in 109 amino acids changed for efficient protein translation in E-coli host cells. Despite the fact that isoelectric point changed from 5.05 to 9.09, no significant alteration was determined in molecular weight, ph value, hydrophobicity, surface probability, antigentic index and the secondary structure in the optimized immunogenic peptide. Homologous structures of other oxidase are posited in optimized immunogenic peptide using protein Prospect suggesting the antibodies derived from this optimized proteins successfully detected only DUOX2 protein in DUOX2 over-expressed cell line by immunoblot. We predicted that the novel DUOX2 antibodies are applicable in immunohistochemical examination of tissue in pathological conditions.