

**TITLE:** Targeted gene therapy for cancer

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**FACULTY MENTOR DEPARTMENT:** Pediatrics

**RESEARCH PROJECT DESCRIPTION:**

**Hypothesis:** rAAV can be used as a gene therapy vector against Medullary Thyroid Carcinoma (MTC).

**Methods:** We will design an Sf9/Baculovirus expression vector (BEV) production system to make a panel of vectors to be screened for MTC targeting in our *in vitro* cell culture model (TT cell line), and our *in vivo* Mouse xenograft model for MTC disease. Methods will include protein purification through chromatography and ultracentrifugation, cell culture of mammalian and insect cell lines, molecular cloning, rAAV infectivity assessment by Green cell counts.

**Role of Medical Student:** The Medical student will participate in the development of the vectors, purification of vectors, as well as in the *in vitro* screening of the vectors.

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Relevant publications<sup>1-6</sup>

1. Messina M, Yu DM, Learoyd DL, Both GW, Molloy PL, Robinson BG. High level, tissue-specific expression of a modified calcitonin/calcitonin gene-related peptide promoter in a human medullary thyroid carcinoma cell line. *Mol Cell Endocrinol* 2000;164:219-24.
2. Aslanidi G, Lamb K, Zolotukhin S. An inducible system for highly efficient production of recombinant adeno-associated virus (rAAV) vectors in insect Sf9 cells. *Proc Natl Acad Sci U S A* 2009;106:5059-64.
3. AGTC Lands the First Billion-Dollar Deal for a UF Startup. <http://research.ufl.edu/otl/agtc-lands-the-first-billion-dollar-deal-for-a-uf-startup.html>. 2015.
4. Mietzsch M, Casteleyn V, Weger S, Zolotukhin S, Heilbronn R. OneBac 2.0: Sf9 Cell Lines for Production of AAV5 Vectors with Enhanced Infectivity and Minimal Encapsidation of Foreign DNA. *Hum Gene Ther* 2015;26:688-97.
5. Mietzsch M, Grasse S, Zurawski C, et al. OneBac: platform for scalable and high-titer production of adeno-associated virus serotype 1-12 vectors for gene therapy. *Hum Gene Ther* 2014;25:212-22.
6. Bockmann M, Hilken G, Schmidt A, et al. Novel SRESPHP peptide mediates specific binding to primary medullary thyroid carcinoma after systemic injection. *Hum Gene Ther* 2005;16:1267-75.