Betty A. and Donald J Baumann Family Scholarship Fund Application Form

1. Name

   Nicholas Mason

2. Chemistry Faculty Research Director

   Dr. Martin Hulce

3. Research proposed (Please copy proposal into the box below this section. It will expand to include all text. The proposal is not to exceed 500 words and is not to exceed 2 pages. A summary of work already completed should also be included, if appropriate.)

   The neuropeptide, calcitonin gene-related peptide (CGRP) has been found to be a potent vasodilator in both central and peripheral nervous systems. CGRP (8-37) has been found to be an antagonist for the calcitonin gene-related peptide receptors. Benzylating His(10) of CGRP (8-37) has been shown to increase the affinity of the antagonist to the receptor. Increasing the binding affinity could potentially lead to developments in anti-migrane drug therapy as well as treatments for complications of arthritis. Previous researchers extracted samples of Bn-His(10)-CGRP (8-11) from tryptic digest of post-SPPS benzylated CGRP (8-37). To conclusively identify the positioning of benzylation of the His(10) residue, synthesis of a series of CGRP (8-11) analogues was accomplished by solid phase peptide synthesis (SPPS). CGRP (8-11) and N(τ)-Bn-His(10)-CGRP(8-11) have been synthesized and characterized. This was done with Reverse Phase High Performance Liquid Chromatography paired with tandem mass spectrometry and 1H,1H COSY NMR. Further analoges are required to unambiguously identify the correct position of benzylation. These include N(π)-Bn-His(10)-CGRP(8-11) and Bn-N(α)-Val(8)-CGRP(8-11). Two synthetic strategies have been devised to produce N(π)-Bn-His(10)-CGRP(8-11). The first involves benzylation before coupling via SPPS and the other involves benzylation on Wang resin post coupling. Likewise, two methods of synthezing Bn-N(α)-Val(8)-CGRP(8-11) have been devised. The first method will benzylate the N-terminus Valine post coupling while on Wang resin, while the other strategy will involve benzylation of N-terminus Valine post cleavage from Wang resin. After each analoge has been synthesized they will be characterized in a similar fashion as the previously synthesized analoges. The benefit of these reactions will be two-fold. First, spectroscopic data gained from these analoges will help complete the library of possible benzylated positions to in order to conclusively identify the position of the origionally isolated Bn-His(10)-CGRP(8-11) analog. Additionally, multiple

synthetic strategies allows for the evaluation of each method via percent yield, time of synthesis, and complexity of isolation. This information will provide future researchers a more efficient methods of synthesizing these analoges for further modification or clinical trials.

4. Plans for presentation of research results (conference, publication, seminar, etc.)

   ACS Midwest Regional Meeting 2016

   ACS National Meeting 2017

   Nebraska Academy of Sciences Meeting 2017

5. Post-graduate plans (job market, graduate school, medical school, etc.)

   Graduate school (Masters) then Medical School.

For the paper copy only – In addition to above, please include:

Social security number

Applicant signature	Chemistry research director's signature