

# CHEM 430 Experiment 4

## Synthesis and Properties of an Amino Acid

### Part I – Synthesis of Norleucine

**\*\*\* Caution, the following procedures must be done in a fume hood \*\*\***

Carefully place 3.6 mL of 2-bromohexanoic acid in a graduated cylinder. Transfer the acid to a 100 mL round-bottom flask., add 30 mL of ammonia, use a few extra mL of ammonia to rinse out the cylinder and add that to the flask. *Loosely* cork the flask and place it in a large beaker of water on a hot plate; be sure the entire bulb of the flask is immersed in the water. Heat the water to 70 °C, remove the beaker from the hot plate and set aside 30-40 minutes. Vacuum filter the precipitate and rinse the crystals with 10 mL methanol. Allow the crystals to remain on the aspirator until dry.

### Part II - Properties of Amino Acids versus Amines and Carboxylic Acids.

In test tubes, test the solubility of a small amount (a few milligrams) of your amino acid from Part I in 1 mL water, 1 mL 5% HCl and 1 mL 1N NaOH. Repeat these tests with an amine (*p*-methoxyaniline) and a carboxylic acid (*p*-methoxy benzoic acid). Record your observations for all these tests.

*For your report you will need an introduction, conclusion and a discussion of the synthesis; please include the chemical equation, a discussion of the % yield and mechanism for this reaction (how does ammonia react with 2-bromohexanoic acid to make an amino acid?). Is there any use for norleucine? From what you know about the various forms of an amino acid at differing pHs, do the acid-base tests give the expected results?*

Before you leave, set up the yeast experiment:

**Before leaving lab, you need to set up Experiment 6, so the yeast can ferment and carry out their chemistry over a period of a few days.**

- In a clean 500mL Erlenmeyer flask (provided) dissolve 46 g of sucrose and 0.300 g of disodium hydrogen phosphate in 200 mL of water.
- Add approximately 10 g of dry yeast. Mix thoroughly.
- After about 2-3 minutes of mixing (CO<sub>2</sub> is evolved) add 3 mL of ethyl acetoacetate via the Eppendorf pipette
- Cap the flask with a stopper and attach vent line from the stockroom. Assemble as shown.
- Mark the flask with a grease pencil with your initials.
- Secure the flask in the 35 °C water bath provided and leave until next lab.

