

## **CURE Course: Precision** Ketogenic Therapy Through the Life Cycle

Dr. Peggy R. Borum's Metabolic Assessment Laboratory

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## CURE Class End of Semester Reflection Hailey Maurer, Spring 2021

Through our work with Dr. Borum this semester, our class had a unique opportunity to learn about the significance of Precision Ketogenic Therapy (PKT) in treating epilepsy patients. Prior to taking this class, many of us had very little knowledge of how PKT could be used to improve the lives of patients with epilepsy. Despite our initial lack of familiarity with this topic, the work completed by our class over the course of the semester allowed us to engage with the research being undertaken to make PKT more accessible to patients. While our contribution this semester covered only a fraction of the tasks undertaken by the lab, completing nutrient runs and recipes allowed the members of our class to make meaningful contributions to patient treatment.

The members of our class first engaged in the research process through the development of patient profiles. This foundational process allowed us to gain important context for the work we would develop throughout the semester. After being assigned a particular patient age group, we collaborated in small groups to establish details about our patients' personal and physical characteristics. Filling in details such as how the patient experiences seizures, how they spend their time, and what they prefer to eat helped to humanize the research process, because we understood that these factors would affect how the patient would interact with a PKT prescription. Other details, such as the patients' nutritional needs and ability to prepare specific and carefully measured meals, would affect their ability to adhere to PKT over an extended period.

Our interactions with a variety of mentors and guest speakers allowed the class to view our progress in the context of real-world patient treatment. Our work throughout the semester was guided by Dr. Borum and Ms. Gain, who shared their experiences with researching and administering PKT and offered feedback at each stage of our research. In addition to interactions with these primary mentors, our class was also fortunate to speak with Dr. Winesett, a pediatric neurologist, on several occasions. His discussion of patient surgeries provided a unique opportunity to think about PKT in relation to other treatment forms; we began to better understand that there is no universal solution for epilepsy, which gave us a greater appreciation for the research being undertaken to advance epilepsy treatment. As a class, we also viewed videos prepared for international epilepsy conferences; these videos supplemented our general knowledge of PKT and provided us with an occasion to discuss the history of PKT and its current use in epilepsy treatment. Our class further benefitted from several graduate student presentations, which allowed us to acquire more detailed knowledge of the science behind food product nutritional information. These experiences provided the members of our class with an important knowledge base as we began our research; by interacting with a variety of experts in PKT and epilepsy research, we benefitted from their unique perspectives while continuing to develop our own.

As a class, we understood that we were completing nutrient runs and creating recipes in the interest of helping our patient. Consequently, our work developed a greater sense of purpose. More impersonal steps such as entering food data gained greater meaning as we connected this data to our patients' needs. Similarly, creating recipes became a more engaging process as we developed meals while keeping the needs and preferences of our patients in mind. Completing

this research in constant connection to our fictional patients provided much-needed context and motivation to complete our assigned tasks thoroughly and insightfully.

As we began to complete nutrient runs, we gained a greater understanding of the food products that could be used in in PKT patient recipes. By finding food products in stores and online, we were able to notice differences in the fat and carbohydrate content of similar food products; this would be relevant as we began to develop recipes later in the semester. Most importantly, our completion of nutrient runs allowed us to assist in expanding the Foodomics database. Entering data into the Foodomics database required a high degree of precision and collaboration; as we collected pictures of the food products, it was important that we followed the standard operating procedures in order to ensure that the information was correct and legible. We also needed to make sure that that we were correctly entering all the relevant information for each product. Through this process, we also learned to collaborate with one another by dividing up work within the group and completing audits for other teams.

After being exposed to the process of data collection, we could then think about the application of these foods to our patients' diets. At this point in the semester, many of us revisited our patient profiles to consider how the foods in the database could be used to help our patients. Creating a patient diet prescription was important as the PKT for each patient began to take shape. Establishing the patients' nutritional needs was also an essential step as we began to think about simplifying and adjusting recipes, allowing us to build on the knowledge we had gained through nutrient runs and move forward in the research process.

Making recipes required more involvement and creativity than the other steps we had completed up to that point. While we had been given assignments for other parts of our research, the recipe making stage provided more freedom. This can be seen in the wide variety of recipes created by our class, where our own culinary experiences and preferences are reflected in the meals designed to meet our patients' nutritional needs. The recipes also varied depending on the age of the patients they were designed for. For example, those working with very young or old patients had to keep in mind the kinds of foods that were safe to feed patients in these age groups. Simple recipes were optimal for infant patients, but for teenagers and adults, a greater variety of meals were needed. For all patient groups, we found that it was important to create recipe instructions that were clear, succinct, and tailored to our patients' preferences and abilities. Our work in creating these recipes, compiled in the class cookbook, display a level of creativity and clarity that we can be proud of.

Since the beginning of the semester, we have become more knowledgeable of epilepsy and PKT, more skilled in collaborative research, and more involved in the intricacies of the research process. Although our time working together this semester has been short, our contributions to the Foodomics database are important, as they will be applied to helping real patients in the future. Through our talks with Dr. Borum, Dr. Winesett, and Ms. Gain and other students in the lab; our contribution to research within the scope of the class; and our experience presenting at the Undergraduate Research Symposium, we have come a long way this semester in understanding the relationship between PKT and epilepsy treatment.