

DIETETICS PROGRAM

PORTFOLIO SUMMARY



KAREN CASEY

FALL 2022



UNIVERSITY OF
NORTHERN
COLORADO

INTRODUCTION: KAREN CASEY

FOODSCIENCEBYKC.COM

- Science, Food and Helping People are my passions, and I have a track record of success to back that up!
- Non-traditional student, transitioning from a career as an aerospace engineer into my next career as a Registered Dietitian
- My dietetics experience includes a formal education, research, volunteering and hands on experience
- Seeking an internship position so that I can complete my RDN credential
- Following charts are examples of my projects, research and job shadow experiences
- Very specialized, in-depth knowledge of low-protein, PKU diets
- Check out my website: foodsciencebykc.com



MY DIETETICS PROJECTS AND TECHNICAL RESEARCH

- Food and Culture
 - Northern New Mexican Food
 - Christmas Eve Polish Feast
- General Nutrition
 - Food Sources of Anthocyanin
 - Food Science Experiments
 - Antioxidant effects of Anthocyanin on general health
- Community Nutrition
 - RDN Shadow at Rocky Mountain Family Practice
 - Adult Alcohol Intake and Awareness Campaign
 - Meals on Wheels Denver Operations Kitchen
- Children's Games and Education
 - Blast off at the Farmers Market
 - Sugar See Saw
 - Aldo de Mayo (Taco de Mayo) Organic Chemistry
- Technical Research into PKU
 - Biochemistry of PHE Metabolism
 - History of Phenylalanine Ammonia Lyase Discovery
 - Metabolic Reroute of PHE Metabolism with Phenylalanine Ammonia Lyase
- Other Metabolic Conditions and Treatments
 - Overview of Pyruvate Carboxylase Deficiency
 - Enzyme Replacement Treatment for Lysosomal Storage Diseases
- Cystic Fibrosis
 - Positive Effects of Tube Feeding on Lifespan and General Health
 - Literature search/Survey Tube Feeding and BMI in children with chronic conditions

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FOOD AND CULTURE PROJECT: NORTHERN NEW MEXICAN FOOD



Squash Blossom Soup



Elk Enchiladas with Red Chile



Vegan Tamales

Project to Develop/Modify Recipes for Restricted Diets Using Local Ingredients

FOOD AND CULTURE PROJECT: CHRISTMAS EVE POLISH FEAST



- Researched a new culture and its food traditions
- Created a menu that balanced nutrient intake, and accommodated a low protein diet

Project to Research Food Traditions and Ingredients to Develop a Culturally Appropriate Menu

RESEARCH INTO ANTHOCYANINS: NUTRIENT CONTENT OF MUFFINS



- Formulated recipes for blue corn muffins
 - Traditional ingredients: milk, flour, eggs, cornmeal
 - Low protein ingredients: rice milk, starch, xanthium gum, yucca flour, Metamucil, egg replacer, cornmeal
- Researched the biochemical benefit of anti-oxidants
- Conducted a literature survey of current research into the link between anthocyanin intake and improved health outcomes

Project to Research Food Sources of Anthocyanins, Modify Recipes to Increase Anthocyanin Content

FOOD SCIENCE EXPERIMENTS



RDN CLINICAL PRACTICE SHADOW: ROCKY MOUNTAIN FAMILY PRACTICE

- Shadowed an experienced RDN in a rural community health care practice
- Observed patient interaction, education and counseling methods
- Gained direct experience creating medical records, insurance billing, and the variation of nutrition guidance that is provided in a general practice setting
- Performed a full assessment, diagnosis, intervention on a patient newly diagnosed with diabetes Type 2



COMMUNITY NUTRITION PROJECT: ADULT ALCOHOL INTAKE AWARENESS & EDUCATION

- Researched rural community demographics and health data
- Created a marketing and education campaign “Every Drink Counts”
- Designed a flyer and handout
- Constructed a 4-hour workshop on portion size, recipes for mocktails and resources for additional help

Which Drink Below **Contains** the Most Grams of Alcohol?

 A. Five (5) oz of red wine?

 B. Sixteen (16) oz of beer?

 C. Three (3) oz of whiskey?



Every Drink Counts

Scan this Code to Find the Answer

Studies have shown a link between alcohol intake and increased health risks. Dietary guidelines recommend reducing intake to no more than than **ONE** drink per day for women, and **TWO** drinks a day for men.

 www.cdc.gov/alcohol

Call St. Vincent's Health at **719-486-0230** to schedule an appointment with Karen Casey, a dietary specialist.

EVERY DRINK COUNTS

How to Accurately Measure and Moderate Alcohol Intake

Ways to Track Limits

Self-monitoring is a good way to evaluate whether you are within the recommended limits.

- **Use a Health Tracking App:** Most food tracking applications also have a way to track alcohol, by the drink.
- **Take an online quiz:** Use a screening tool to check your patterns and to help plan ways to reduce drinking.



- Find more information at cdc.gov/alcohol

- Talk to your **doctor** about risk factors

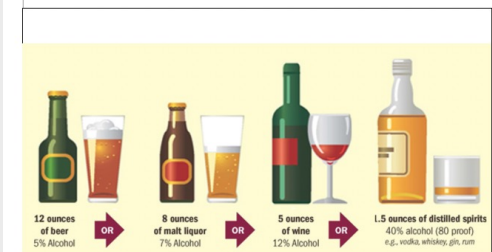
If a family member or friend has raised a concern about your drinking habits, seek help through local or national organizations: aa.org

Alcohol and Health

Moderate alcohol intake can be incorporated into a healthy lifestyle; however, it is important to be aware of what really constitutes **one drink**, and to adhere to limits to maintain overall health and not increase the risk of chronic disease.

- **One drink** is 5 oz of wine, 12 oz of beer or 1.5 oz of hard liquor
- The CDC recommendation for intake **limits** is no more than 1 drink per day for women and 2 drinks per day for men
- Binge drinking is consuming **multiple drinks** on one occasion – for women this is 4 drinks and for men 5 drinks.
- **Heavy drinking** is defined as consuming 8 or more drinks per week by women and 15 or more drinks by men

The % of alcohol is different between beer, wine and distilled spirits. Both the size and type of drink matter.



MEALS ON WHEELS: DENVER OPERATIONS MAIN KITCHEN

- Spent a day shadowing the Director of the Meals on Wheels food production facility
- Observed and participated in the daily food preparation, packaging and clean up
- Learned about USDA regulations for menu planning



VOLUNTEERS OF AMERICA COLORADO BRANCH MEALS ON WHEELS MENU NOVEMBER 2023				
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Mushroom Swiss Burger on a Whole Wheat Bun Brown Rice with ketchup and mustard Potato Wedges Spiced Peaches Blueberry Applesauce 1% Milk	Sweet and Sour Pork Brown Rice Mauz Vegetable Blend Wheat Bread with Margarine Mandarin Oranges 1% Milk	Cheese Stuffed Shells with Meat Sauce Cannellini Beans Seasoned Spinach Whole Wheat Roll with Margarine Banana Orange Juice 1% Milk	California Dreamin' Orange-Glazed Haddock Long Grain and Wild Rice Blend Edamame Succotash Multigrain Roll with Margarine Tangerine 1% Milk Fruit Yogurt	Chicken Breast with Apricot Glaze Persian Rice and Lentils Summer Squash with Onions 8-Grain Sandwich Bread with Margarine Apple Fruit Yogurt 1% Milk
Chicken Cassoulet Spinach Omelet Apple Glazed Carrots French Bread with Margarine Orange 1% Milk	Roast Pork Chop with Diane Sauce Rosemary Parmesan Potatoes Italian Vegetables Cornbread with Margarine Apple Grape Juice 1% Milk	Fish Veracruz Borriacho Beans Seasoned Greens Multigrain Bread with Margarine Country Vegetables 1% Milk	Chicken Fried Steak with Country Gravy Mashed Potatoes Country Vegetables Whole Wheat Bread with Margarine Diced Peaches Orange Juice 1% Milk	Caribbean Roasted Chicken Mashed Sweet Potatoes Caribbean Vegetable Blend Hawaiian Sweet Roll with Margarine Mandarin Oranges with Cottage Cheese 1% Milk
Szechuan Chicken 5-Spice Potatoes Asian Vegetable Blend Wheat Roll with Margarine Fresh Pear 1% Milk	Lemon Pepper Fish with Tomato Cream Sauce Rice Pilaf Cape Cod Vegetable Blend 8-Grain Bread with Margarine Berry Mango Compote 1% Milk	BBQ Cheddar Burger on a Whole Wheat Bun Lettuce/Tomato Garnish Roasted Butternut Squash Colorado Baked Beans Orange 1% Milk	Veterans Day Celebration Chicken Fried Steak with Country Gravy Mashed Potatoes Country Vegetables Whole Wheat Bread with Margarine Diced Peaches Orange Juice 1% Milk	Smoky Beef Sirloin Chili Roasted Sweet Potatoes Cauliflower and Carrots Cornbread with Margarine Apple Apple Cinnamon Muffin 1% Milk
Marinated Pork Cutlet with Hunter Sauce Brown Rice Spinach and Mushrooms Whole Grain Roll with Margarine Diced Peaches 1% Milk	Combination Beef & Bean Burrito with Picante Sauce on a Wheat Tortilla Lettuce/Tomato Garnish Seasoned Pinto Beans Mexical Corn Apricot Pineapple Compote 1% Milk	Pueblo Beef Stew Spanish Rice Sautéed and Tomatoes 8-Grain Bread with Margarine Fruit Cocktail Cranberry Juice 1% Milk	Manager's Choice Swedish Turkey Meatballs Parsley Noodles Diced Beets Wheat Bread with Margarine Banana Oatmeal Raisin Cookie Cranberry Juice / 1% Milk	YOA Thanksgiving Holiday YOA Closed/Evening Meal Pre-delivered Macaroni & Cheese Seasoned Carrot Cuts Green Peas Breadstick Fresh Pear 1% Milk
Austrian Goulash with Parsley Noodles Sliced Beets Multigrain Bread with Margarine Apricot Halves Cranberry Juice 1% Milk	Yodko Style Italian Sausage and Penne Stewed Apricots Ratatouille Whole Wheat Bread with Margarine Fresh Pear 1% Milk	Thanksgiving Day Meal Roast Turkey with Gravy and Cranberry Sauce Cornbread Stuffing Green Beans with Almonds 8-Grain Bread with Margarine Cinnamon Applesauce Apple Cinnamon Crisp 1% Milk	Thanksgiving Day Meal Delivered in Denver County Only Manager's Choice	YOA Thanksgiving Holiday YOA Closed/Evening Meal Pre-delivered Macaroni & Cheese Seasoned Carrot Cuts Green Peas Breadstick Fresh Pear 1% Milk



November

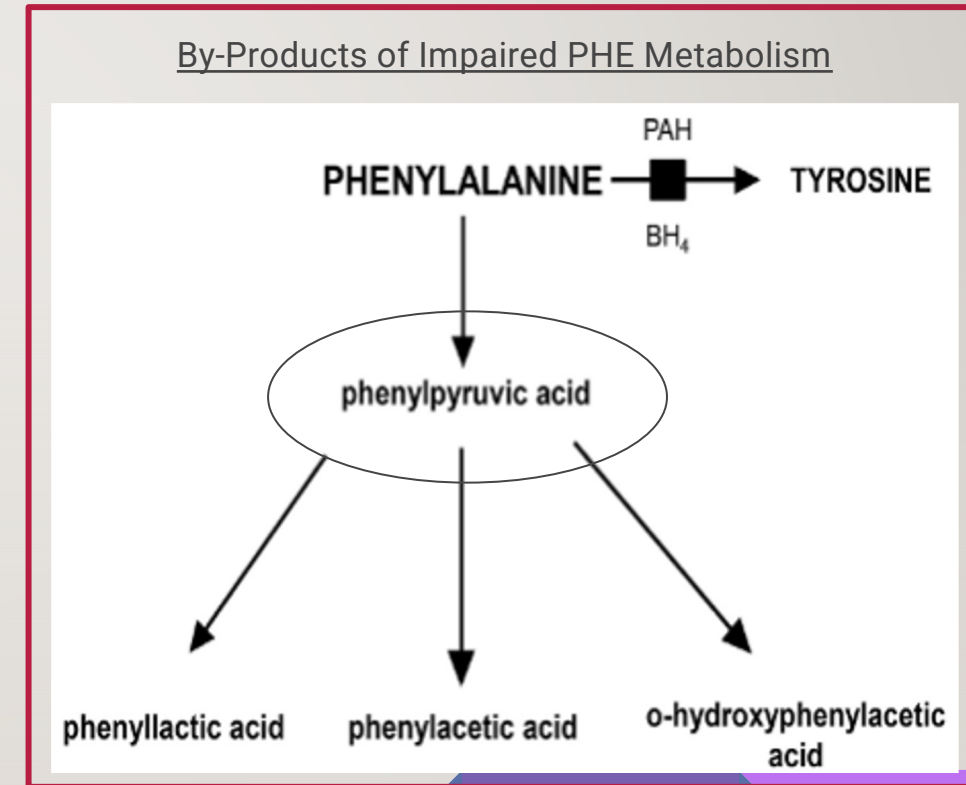
Daylight Savings Time ends November 7th, set your clocks back!
Happy Veterans Day, November 11th!



Menus items may change without notice due to availability of items from suppliers.
The number listed in brackets indicates the mg sodium per menu item. Sodium is omitted unless it is greater than 10mg.
The number in parenthesis indicates the grams of carbohydrates per menu item. Carbohydrates are omitted unless they are greater than 10g.

RESEARCH: HISTORY OF THE DISCOVERY OF PAL, AN ENZYME REPLACEMENT THERAPY

- PAL is Phenylalanine Ammonia Lyase – it metabolizes PHE
- Long road to discovery: 1940's - 2018
 - Research on plant metabolism - process of synthesizing lignin
 - Plants produce phenylpyruvic acid
 - Same metabolite made in humans with impaired PHE metabolism
- Phenylpyruvic acid is metabolized to cinnamic acid by PAL
- Toxicity studies conducted during WWII determined cinnamic acid is not harmful to humans in high doses
- Bacteria *Anabaena variabilis* is good source of PAL
- PAL manufacturing efforts developed
 - Increase enzymatic effect
 - Stabilize at room temperature
- FDA approved drug Palyzinq, using PAL as a treatment for PKU



Literature Search into the multiple disciplines of scientific research that led to PAL Discovery

RESEARCH: PAL ENZYME REPLACEMENT THERAPY TO METABOLIZE PHENYLALANINE IN PATIENTS WITH PHENYLKETONURIA (PKU)

PKU Metabolism Before Treatment

- PAH activity disrupted
- Little to no tyrosine made
- Excess serum PHE
 - Leads to excess phenylpyruvic acid

PKU Metabolism With PAL Treatment

- Enzyme Substitution
 - PAL/Peg-PAL/Palynziq®
- Excess serum PHE metabolized:
 - Trans-cinnamic acid
 - Ammonia

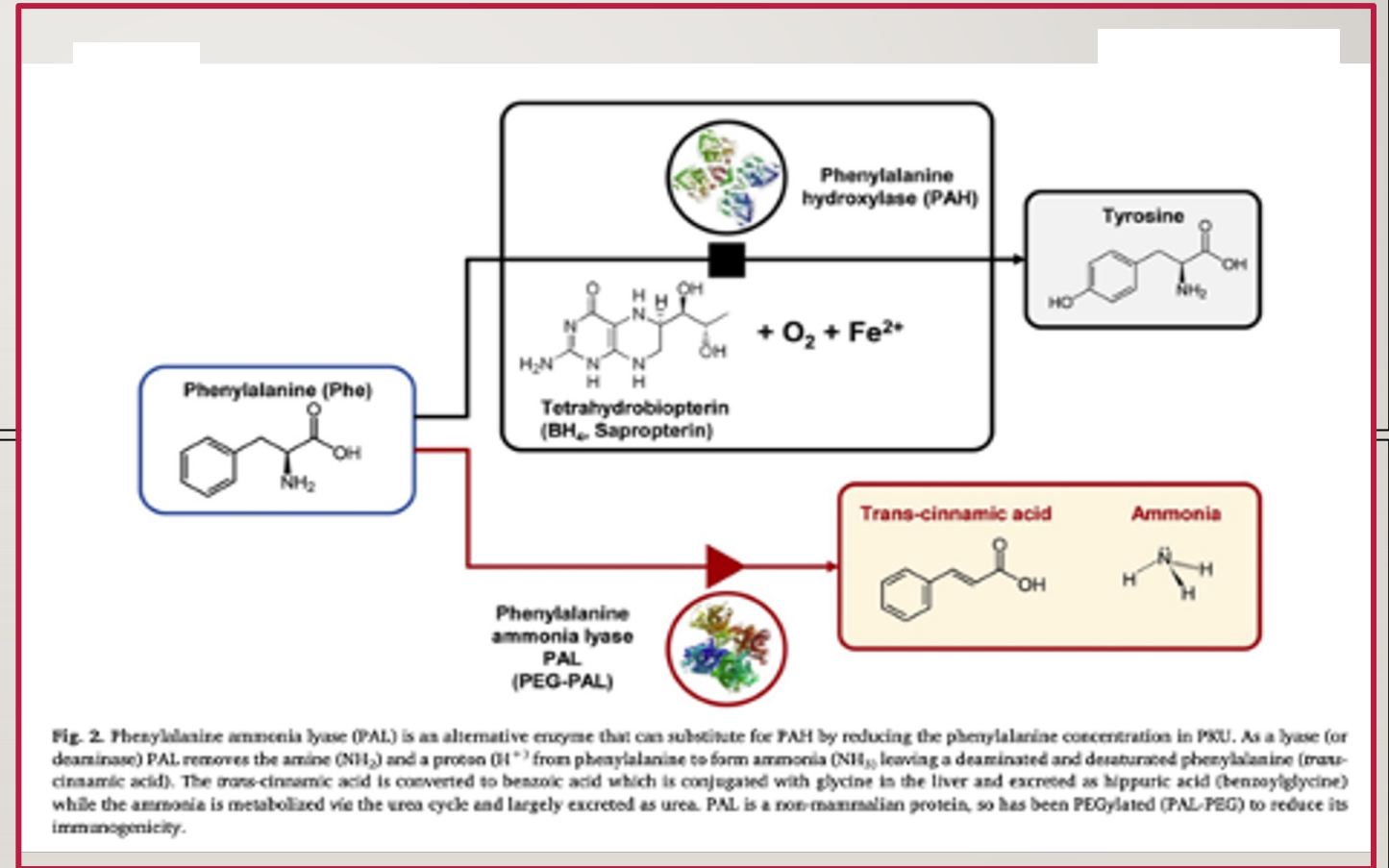


Fig. 2. Phenylalanine ammonia lyase (PAL) is an alternative enzyme that can substitute for PAH by reducing the phenylalanine concentration in PKU. As a lyase (or deaminase) PAL removes the amine (NH₂) and a proton (H⁺) from phenylalanine to form ammonia (NH₃), leaving a deaminated and desaturated phenylalanine (trans-cinnamic acid). The trans-cinnamic acid is converted to benzoic acid which is conjugated with glycine in the liver and excreted as hippuric acid (benzoylglycine) while the ammonia is metabolized via the urea cycle and largely excreted as urea. PAL is a non-mammalian protein, so has been PEGylated (PAL-PEG) to reduce its immunogenicity.

OTHER ACTIVITIES

- Volunteer Peer Mentor for the National PKU Alliance – 2019 - Present
- Activism with Santa Fe Farmers Market – 2000 - Present
- Personal Connection with Dietetics – 2004 - Present
- Degrees, Awards and Certifications – Career Accomplishments

VOLUNTEER PEER MENTOR: NATIONAL PKU ALLIANCE 2019 - PRESENT

- Selected through a competitive process to be in the first cohort of peer mentors for a program to provide resources to adults returning to a PKU diet
- Experience with crisis management, referrals
- Received training in the neurocognitive effects of PKU, motivational interviewing techniques, how to identify and provide resources for high-risk individuals, stress management
- Developed recommendations for transforming/modernizing the Mentoring Program
- Link: <https://www.npkua.org/Resources/Support-Programs>

National PKU Alliance Peer/Pathways Mentoring Program

A Roadmap for How to Establish a World Class Mentoring Program
for Adults Affected by PKU and Allied Disorders

Karen Casey

August 13, 2022 | kcaseyph@gmail.com

ACTIVISM: SANTA FE FARMERS MARKET INSTITUTE

- 20 years of active participation with the organization that transformed the Santa Fe Farmers Market from a dirt parking lot that farmers used to sell produce out of the back of a truck into one of the most premier markets in the country



A DEEP PERSONAL CONNECTION

- A parent of a child living with significant dietary restrictions
- So What Can you Eat? <https://www.youtube.com/watch?v=b2UFKqIVC6o>
- Managed enteral nutrition and delivery methods beginning in infancy
- Created menus that accommodated a diversity of food choices when restricted to 3 grams of protein per day
- Modified recipes to accommodate low protein, vegan choices
- Found creative solutions for food related events: holiday/birthday parties, school activities, summer camp
- Navigated food challenges during both domestic and international travel



My Son, who is also a student at UNC, is by far my most profound personal accomplishment

DEGREES, OTHER CREDENTIALS AND AWARDS

- Master of Science, Discrete Mathematics and Computer Science, University of Colorado Denver
- Bachelor of Science: Mathematics with a minor in Counseling, Metropolitan State University of Denver
- Dietetics Certificate, University of Northern Colorado (complete December 2022)
- Earned the title of Engineering Fellow, distinguished honor for the top 1% of the technical staff
- Hold a Top Secret Clearance and have maintained it my entire career. This requires an extensive background investigation into my personal integrity, financial status, mental health, and activities outside of work. It also requires a routine polygraph exam.
- In 2022 I was the CBS Girls in Science Mentor for Raytheon Technologies. A personal interview and my community engagement activities were featured in both national and local news
- National Finalist for the Society of Women Engineers Annual Award

