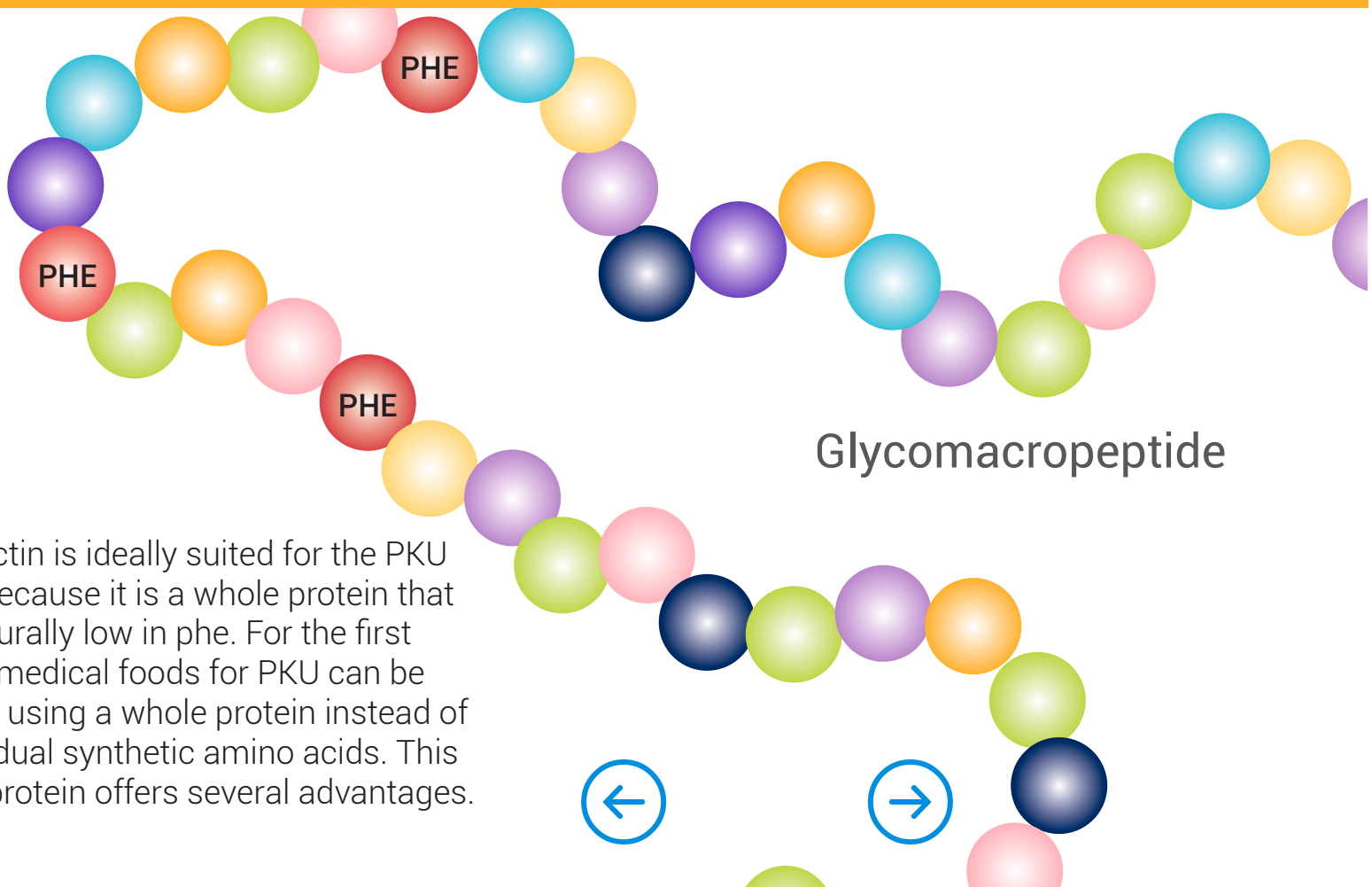
Glytactin™

The next generation of medical foods for PKU

CAMBROOKE THERAPEUTICS™

What is Glytactin?

Glytactin is protein that is made with glycomactropeptide or GMP, a naturally-occuring, whole protein made from whey. Glytactin is Cambrooke's blend of GMP plus 5 amino acids, formulated to provide the highest quality protein.



Glycomacropeptide

Glytactin is ideally suited for the PKU diet because it is a whole protein that is naturally low in phe. For the first time, medical foods for PKU can be made using a whole protein instead of individual synthetic amino acids. This new protein offers several advantages.

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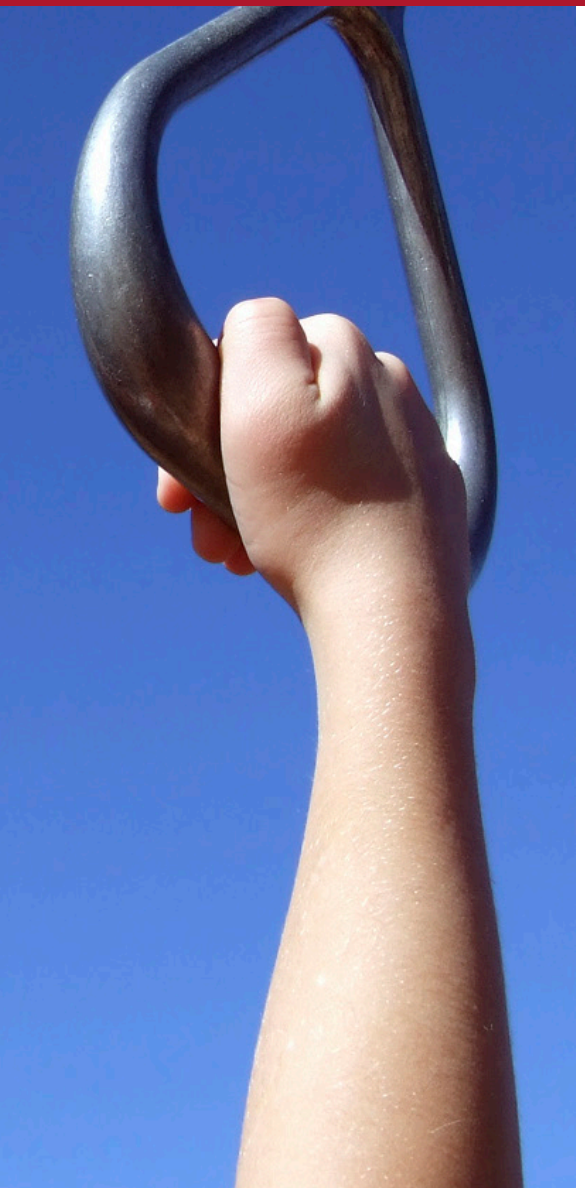
Whole Protein

Glytactin is absorbed and utilized better than amino-acid based products.



Whole protein is absorbed more slowly and stays in the body longer, whereas amino acids are rapidly absorbed and processed more quickly. Research shows that people with PKU taking GMP medical foods had greater nitrogen retention than those taking amino acid-based medical foods. Retaining nitrogen means building up protein stores whereas losing nitrogen indicates muscle wasting.

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GMP-GLYTACTIN AND PROTEIN UTILIZATION

The GMP-based diet contains more whole protein than the traditional PKU diet. A GMP-based diet provides approximately 70% of protein from whole protein (found in GMP-medical foods and food allowed on a diet for PKU) and approximately 30% of protein from synthetic amino acids. In contrast, traditional diet for PKU provides approximately 80% of protein from synthetic amino acids and 20% from food sources.

Not all GMP products are the same. Glytactin is a unique blend of GMP that is supplemented with specific amino acids to ensure a high quality protein. The types and amounts of amino acids added are based on clinical evidence[1] and meet World Health Organization requirements for the proper ratio of the branched-chain amino acids, leucine and isoleucine.[2] Since these amino acids share a degradative enzyme, an improper ratio can result in relative deficiency of one, which can impair protein synthesis. Glytactin with GMP has been shown to maintain plasma branched-chain amino acids in the normal range.[3]

Glytactin-based products are absorbed and utilized better than products made solely from amino acids. When a person consumes amino acids alone, the concentration of amino acids in the blood rises rapidly and then decreases rapidly, whereas if a person consumes whole protein the concentration of amino acids in the blood is slower to rise and stays higher for longer.[4] This more stable concentration of amino acids in the blood enhances protein synthesis (building lean body mass), and may also be related to the greater satiety reported by subjects taking Glytactin.

A Glytactin-based diet improves nitrogen retention. In one study, subjects with PKU had significantly lower blood urea nitrogen (BUN) concentrations and significantly higher total amino acid concentrations after consuming a GMP-based meal as compared to an amino-acid based meal.[1] A lower BUN means more nitrogen is being retained and a higher amino acid concentration means that the amino acids are not being oxidized rapidly and are available in the pool of amino acids needed for protein synthesis. Also, plasma albumin concentration was significantly higher with Glytactin in support of improved protein synthesis compared with the amino acid-based diet.[3] Indivdiuals with PKU consumed Glytactin-based medical food more often than they did amino acid-based medical food. Taking medical food throughout the day improves protein synthesis and stabilizes blood phenylalanine.[5]

In summary, Glytactin contains a unique blend of GMP plus amino acids that provides a safe, effective alternative to amino acid-based diets and enhances protein synthesis in individuals with PKU.

References: 1. van Calcar S et al. *Am J Clin Nutr.* 2009;1068-77. **2.** World Health Organization Technical Report Series 935, 2007. 3. Ney D. et al. *Am J Clin Nutr*. 2016; 105: avail Aug 2106. **4.** Gropper S. et al. *JPEN* 1991;15:48. **5.** MacDonald A. et al. *Arch Dis Child*. 1996; 74:412.

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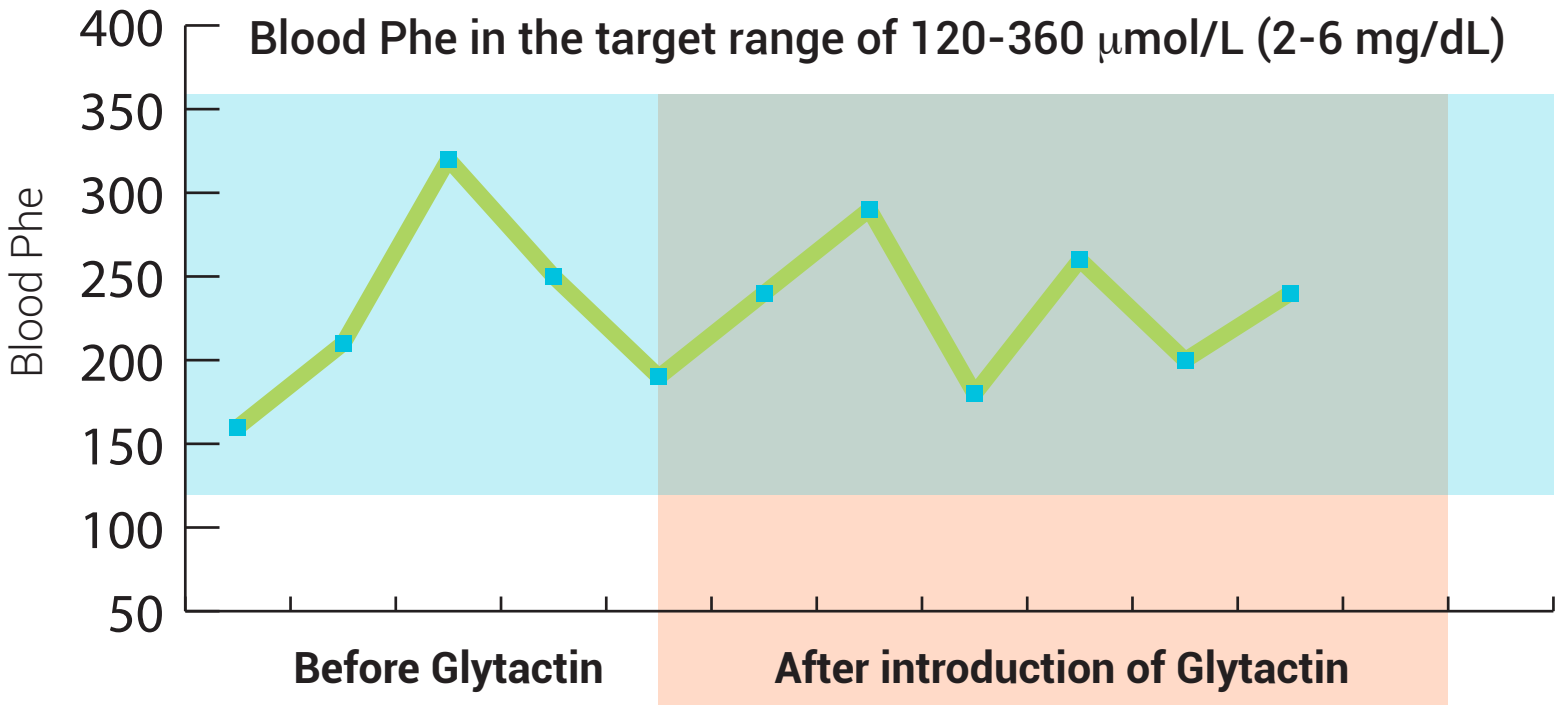
Blood Phe

Maintain good blood Phe control on Glytactin medical foods



Blood Phe concentrations are not significantly higher in patients taking medical foods with Glytactin, even though there is a small amount of Phe in the products.

*Click the **Watch** button to review study findings.*

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Glycomacropeptide (GMP) for Nutritional Management of Phenylketonuria (PKU): A Randomized, Controlled, Crossover Study

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Waisman Center Affiliate
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Published in *American Journal of Clinical Nutrition*
August 2016, available free access
http://ajcn.nutrition.org/

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Acceptability

Patients report feeling better when taking products with Glytactin

Tastes better so individuals with PKU are willing to take Glytactin more frequently

Feel fuller, less hungry

Supports production of healthy gut bacteria (GMP is a prebiotic)

Less gastrointestinal upset (such as diarrhea, cramping, stomach upset)

*Click the **Watch** button to see more about acceptability.*

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Glycomacropeptide (GMP) for Nutritional Management of Phenylketonuria (PKU): A Randomized, Controlled, Crossover Study

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Published in *American Journal of Clinical Nutrition*
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Less Hungry

Glytactin reduces the appetite hormone ghrelin

Ghrelin is highest when a person is fasting and lowest after a meal. Research shows that people with PKU have lower ghrelin after consuming Glytactin than after having an amino-acid based formula. Lower ghrelin means less worry about being hungry on the Phe-restricted diet.

Macleod E et al. *Mol Genet Metab*. 2010 Aug; 100(4): 303–308.

Who are good candidates for Glytactin?

Anyone who needs a change in medical food!

*Click **READ** button to to learn about a dietitian's experience with Glytactin.*

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WHO NEEDS A CHANGE IN MEDICAL FOOD AND WHEN?

Because consuming medical food (also called formula) is so important to proper nutrition and metabolic control for individuals with PKU, dietitians often do not suggest a change if a patient is content with his or her current product. Dietitians will only recommend a change if the current medical food is not meeting nutritional needs or if the patient is not taking the full amount of medical food prescribed.

Getting the prescribed amount of medical food. Patients, especially teens and adults, often report that they can get "all but" one or two of the servings they should consume. Reasons for this include not wanting to bring medical food to school or work to being busy in the evening and forgetting the last serving. Glytactin is available in many forms (bars, drinks, powder, pudding, sachets) to make taking medical food more convenient, and studies show that patients are willing to take Glytactin products more often during the day than amino-acid based products.

Meeting nutritional needs. A change in medical food is indicated nutritionally when either the protein or the energy content of a product is not meeting a patient's needs. Commonly, a product with a higher protein to energy ratio, such as Glytactin, is needed after infancy. This is a good time to consider Glytactin because children's taste preferences are imprinted at an early age. Offering an alternative taste to amino-acid based formulas before age 2 years may enhance acceptance later on. More protein is also needed during adolescence or for patients who desire a post-workout protein supplement.

Phe prescription on Glytactin. What about the extra phenylalanine in GMP? Indeed, the Phe content is higher in products containing GMP; however, studies show an insignificant increase in blood phe in patients taking these medical foods. Glytactin-based medical foods have been used for young children and pregnant women who did not tolerate amino-acid based medical foods and they maintained blood phe in the target range of 120-360 μmol/L (2-6 mg/dL). For patients with severe forms of PKU, the Phe content of the Glytactin must be considered, however for patients with more moderate forms of PKU, the additional Phe is easily tolerated requiring no adjustment in Phe intake. For adults returning to diet, the Phe in Glytactin is usually a small contribution to the total Phe intake and as patients start consuming adequate protein and build lean body mass, they can tolerate the additional Phe .

Monitoring is important. As with all patients with PKU, close monitoring of nutritional intake and blood Phe is key to successful diet management.

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Getting enough medical food during the day

Get off to a good start

Fits into your lunchbox, fits into your lifestyle

Perfect pairing for exercise

For a mid-morning snack

Put in your backpack, purse, or pocket.

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A parent's experience

"My boys never liked their "milk"* and one had real problems keeping it down since the time he started the diet. It seemed he was always throwing it up and fighting me to take it.

Bettermilk was really a lifesaver for us. The boys were able to handle it so much better and the stomach problems went away. Their blood Phe levels also actually dropped! As a parent, I felt better giving Glytactin to them knowing that it was more natural."

** An amino-acid based product*

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Your next steps

- Ask your dietitian about changing to Glytactin medical foods
- Request a free trial kit
- Discover how Cambrooke*care*™ will help navigate insurance coverage
- Learn more *(click on the **LEARN** button)*

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