Humpback Healing 2.0

Nutritional and Medical Benefits of Camel's Milk

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Disclaimer

- The information provided is for educational purposes only.
- It is not to be taken as specific medical advice.
- Please discuss any and all interventions with your medical practitioner prior to initiating any new treatment.
- This presentation will be discussing the science and medical benefits of Camel's milk only. It is not to utilized for specific dosing and/or procurement. Please reference the state laws pertaining to Camel's milk as they differ between states.

Camel's Milk

- **Synopsis:**
  - **Benefits:**
    - **Nutritional**
    - **Gastrointestinal**
    - **Allergies**
    - **Immunologic**
  - **Nanobody Technology**
  - **FRA/CFD and Camel's Milk**
  - **Case reports/Follow-ups**

Nutrition

- **Vitamins**
  - Contains vitamins C, A, E, D, and B group
  - Higher amounts of vitamin C and Niacin (B_3, niacinamide) then bovine (cow) milk
    - Three times higher amount of Vitamin C
  - Lower amounts of vitamin A and riboflavin then bovine milk.
    - There are conflicting reports on B_{12} amounts being lower and higher depending on report.

Nutrition

- **Minerals**
  - Significantly higher amount of iron (Fe) then bovine milk. (up to 10X higher)
    - Fe plays an essential role in a number of biological systems, including oxygen transport and storage as well as DNA synthesis
  - Also significantly higher amounts of Cu (copper)

Nutrition

- **Minerals**
  - **Similar amounts to Bovine Milk:**
    - **Calcium**
    - **Sodium**
    - **Magnesium**
    - **Phosphorus**
    - **Potassium**
      - **Soliman G. Comparison of Chemical and Mineral Content of Milk From Human, Cow, Buffalo, Camel and Goat in Egypt *Egyptian Journal of Hospital Medicine,* Vol. 21: 116-130**

Nutrition

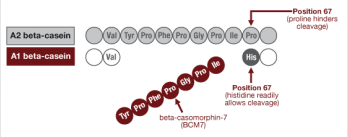
- **Proteins**
  - Total proteins- Avg. 2.15-4.9%
    - Two types: Casein and Whey
  - Casein
    - Does not have the same β-Casein structure as bovine milk.

Nutrition

- **Proteins**
  - Whey
    - Significant source of Lactoferrin, albumin, immunoglobulins, and peptidoglycan recognition protein
    - Does not have β-Lactoglobulin, the major contributor to milk allergies in humans.

Nutrition

- **β-Casein**
  - β-Casein is present in most mammal milks.
    - The difference is the A1 variant and A2 variant.
    - The A1 variant is found in most western breeds of cows. A2 is present in most other breeds, camel's, and breast milk.

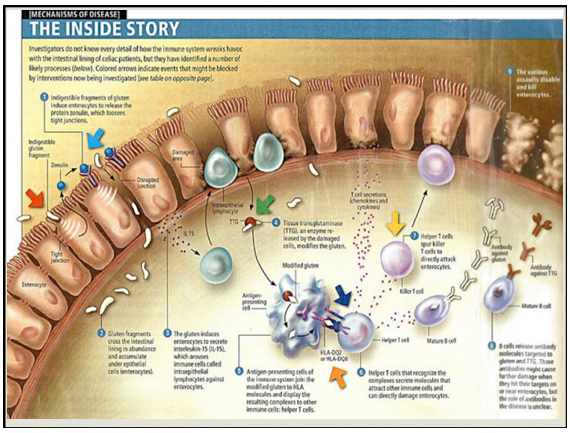


Nutrition

- **Fats**
  - Compared to bovine milk:
    - Lower percentage of short-chain fatty acids.
    - Higher percentage of long-chain fatty acids.
    - Higher amounts of unsaturated fatty acids, especially the essential fatty acids

Gastrointestinal

- Camel milk contains signficant amounts of:
  - Immunoglobulins
  - Lactoferrin
  - Lactoperoxidase
  - Lysozymes
    - **All of which help to restore the normal mucous lining of the intestine, improve the protective abilities of the mucous lining and indirectly bring down inflammation.**



Allergies

- Camels Milk
  - No A1 β-casein
  - No β-Lactoglobulins
  - High amount of immunoglobulins, higher then bovine and breast milk.
    - Reduce the amount of allergic reactions
  - Protective proteins- lactoferrin, lactoperoxidase, NAGase, and PGRP

Allergies

- Has been shown to even reverse allergies in severely allergic children to cows milk.
  - **Shabo Y, Barzel R, Margoulis M, Yagil R. "Camel Milk for Food Allergies in Children."** *IMAJ (2005) Vol. 7: 796-798*

Allergies

REVIEW ARTICLE

World Allergy Organization (WAO) Diagnosis and Rationale for Action against Cow's Milk Allergy (DRACMA) Guidelines

Alessandro Fiocchi, (Chair), Jan Brozek, Holger Schünemann, (Chair), Sami L. Bahna, Andrea von Berg, Kirsten Beyer, Martin Bozzola, Julia Bradsher, Enrico Compalati, Motohiro Ebisawa, Maria Antonieta Guzman, Haiqi Li, Ralf G. Heine, Paul Keith, Gideon Lack, Massimo Landi, Alberto Martelli, Fabienne Rancé, Hugh Sampson, Airton Stein, Luigi Terracciano, and Stefan Vieths

WAO Journal April 2010- 161 pgs. And that is just a review!

World Allergy Organization

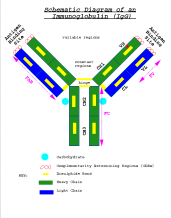
- Alternatives to Cow's milk allergies for children >2 years old.
  - Goat, Ewe's were not recommended due to possibility of severe reactions
  - Alternative to animal milk (coconut, almond, rice, soy) were only to be used in conjunction with other formulas and should not be used exclusively.
  - **Camel's Milk** can be considered a valid substitute for children after 2 years.

Immunological

- Antibodies are classified as IgM, IgG, IgE.
- These antibodies are a part of the adaptive arm of the immune system and work with the innate immune system to identify and remove antigens within the body.

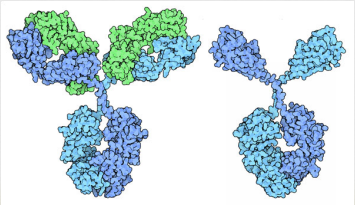
Immunological

- The basic structure of the antibody is a y-shape comprised of heavy-chain and light chain proteins



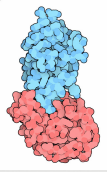
Immunological

- Camels have a unique structure of antibodies called **nanobodies**, which are made up without the light protein chains.



Immunological

- These nanobodies are up to 10x smaller and can penetrate deeper into tissues then conventional antibodies
- Are a part of the IgG class of antibodies
- Camel nanobodies have been shown to treat viral, bacterial, and mycoplasma infections.



What makes it different?

The Medical Benefits of Camel's Milk

- Treatment of milk allergies, no β-lactoglobulins
- Reduction in GI inflammation and improvement in mucosal IgA
- Immunological regulation due to increased amount and different structure of immunoglobulins
- Treatment of chronic bacterial, fungal, and viral infections due to the high amounts of lactoferrin, lactoperoxidases, and unique structure of immunoglobulins

The Medical Benefits of Camel's Milk

- **Diabetes**
  - Regulates Insulin levels in type I and type II diabetics
    - High level of insulin in ruminent (cow, camel, etc.) milk. Especially in colostrum.
    - Although "it is concluded that all milks had insulin, the fact that only camel milk is unaffected by gastric acid allows it to pass into the intestines where it is apparently absorbed."
      - Zagorski et al. Insulin in Milk- A Comparative Study (1998) *International Journal of Animal Science* vol 13: p. 241-244

The Medical Benefits of Camel's Milk

- **Blood Pressure/High Cholesterol**
  - "Fermented" camels milk contains an exopeptidase that cleaves certain peptide substrates that have ACE inhibitory effects.
    - Omar A. Al H, Hamad A. Al K. Compositional, Technical and Nutritional Aspects of Dromedary Camel Milk- A Review *International Dairy Journal* (2010) doi:10.1016/j.idairyy.2010.04.003
  - Also contains orotic acid, which is thought to be responsible for lowering cholesterol levels in human subjects.
    - Buonopane GJ et al. Effect of skim milk supplementation on blood cholesterol concentration, blood pressure, and triglycerides in a free-living human population *Journal of American College of Nutrition*. 11, 56-67

Folate Receptor Autoantibodies

- FRA's have been associated with milk in the diet and Autism Spectrum Disorders.
  - "A Milk-Free Diet Downregulates Folate Receptor Autoimmunity in Cerebral Folate Deficiency Syndrome"
    - Raemakers V , Sequiera J, Blau N, Quadros E. *Developmental Medical Child Neurology* (2008) (50) 5: 346-352
  - "Cerebral Folate Receptor Autoantibodies in Autism Spectrum Disorders"
    - Frye RE, Sequiera JM, Quadros EV, James SJ, Rossignol DA. *Molecular Psychiatry (2012) 1-13*

Folate Receptor Autoantibodies

- What we know:
  - Folate receptor antigens are present in human placenta, breast milk and bovine milk.
  - There has been one sample of camel's milk tested by Dr. Quadros showing similar amounts of antigens as bovine milk.
  - It is presumed that the FR antigens pass into the body via the GI system. A compromised immune barrier in this system can be considered as the potential cause of the autoimmune response
  - Most of the FR autoantibodies belong to the IgG 4 subclass of antibodies in humans.

Folate Receptor Autoantibodies

- What we know:
  - Camel's milk contains a high amount of IgG antibodies (nanobodies) that are unique to camel's milk and not found in either breast milk or bovine milk.
  - Camel's milk contains significant amounts of protective proteins and immunoglobulins .
    - **All of which help to restore the normal mucous lining of the intestine, improve the protective abilities of the mucous lining and indirectly bring down inflammation.**

Case Reports

- The following are the reports of families that have, on their own, added camel's milk to their children's diet.
- They all started the milk on their own and increased on their own with as they felt it benefitted their child and through their own research.
- There are no set guidelines in the US to dosing camel's milk and should be approached as you would any new food or drink.
- None of the families are patients of mine or my medical director. They are volunteers that graciously documented their progress for the benefit of others that may want the knowledge of their experience.

Summary

- Camel's milk has been utilized as a medicinal and healing food source for centuries. Has been studied for its medicinal value for over 30 years.
- Camel's milk is a valuable asset to consider.
  - Less Allergenic
  - Great source of protein, iron, vitamin C
  - High amount of protective proteins
    - Increased immunoprotection in the small intestine
      - Antibacterial, Antifungal, Antiviral properties
      - Increased Secretory IgA in the small intestine
  - High amount of Immunoglobulins
    - More antibodies then breast milk
    - Unique structure: Nanobodies

Summary

- No β-casomorphin production from casein cleavage.
- Folate Receptor Autoantibodies
  - Has similar amount of Folate Receptor Antigen
  - Comparing Cow's milk/Camel's milk FRA reactions in the body has not been studied
    - Making assumption that the reaction of autoantibodies would be similar is presumptuous.
    - The immunologic healing capabilities of camel's milk far exceeds cow's milk
    - Two case reports demonstrating that positive FR autoantibodies while consuming camel's milk did not lead to regression. With and without Leukovorin.