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Horse Milk and Kumis as Potential Adjunct Nutritional Therapies in Oncology: A Review of Preclinical and Clinical Evidence

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Introduction

Horse milk and its fermented product, kumis, have been used for centuries in traditional medicine and nutrition among the peoples of Central Asia, Kazakhstan, Mongolia, and parts of Eastern Europe. Historically, kumis was consumed not only as nourishment but also as a means to support gastrointestinal health, boost immunity, and aid recovery from serious illnesses such as tuberculosis and chronic digestive disorders.

Recently, scientific interest in horse milk has grown due to its unique biochemical composition. Unlike cow's milk, it contains higher amounts of whey proteins and less casein, making it easier to digest and more similar to human breast milk. Key bioactive components include immunoglobulins, lactoferrin, lysozyme, conjugated linoleic acid, and vitamins A, C, and E. In fermented form—kumis—it also contains a complex of probiotic microorganisms [1,2].

Modern studies have demonstrated that horse milk and kumis exhibit significant antioxidant, antimicrobial, and immunomodulatory properties. These features are particularly important for oncology patients who require immune support and restoration of gut microbiota during and after treatment.

This review aims to summarize the available preclinical and clinical data on horse milk and kumis, as well as evaluate their prospects for use in oncology and rehabilitation medicine.

Preclinical Evidence

Preclinical studies have mainly been conducted in countries with traditional kumis consumption—Kyrgyzstan, Kazakhstan, Mongolia, and Russia. They focus primarily on investigating the antioxidant, antimicrobial, and immunomodulatory potential of these products.

Antioxidant and Anti-inflammatory Properties

Several experiments have shown that horse milk contains significant amounts of vitamins A, C, E, and beneficial fatty acids, including conjugated linoleic acid. These substances effectively reduce oxidative stress—a key factor in tissue damage and carcinogenesis, especially during chemotherapy and radiation therapy.

Animal studies demonstrated that administration of horse milk extracts reduces markers of inflammation and oxidative damage in the liver and gastric mucosa, suggesting tissue protection from toxic effects of drugs and radiation [3].

Immunomodulatory Effects

Certain protein components such as lactoferrin and lactoglobulins in horse milk can modulate the immune system. Experiments in rodents showed that regular kumis consumption increases macrophage and natural killer (NK) cell activity and normalizes cytokine levels-key regulators of inflammatory processes.

A study in Mongolia confirmed improved nonspecific immunity in immunodeficient animals after regular kumis intake, accompanied by increased lymph node mass [4].

In vitro Cytotoxicity

A few studies have evaluated the direct cytotoxic effects of horse milk components on cancer cells in vitro. Whey proteins and casein were found to inhibit proliferation of breast cancer (MCF-7) and some other epithelial tumor cell lines. However, in vitro results do not always translate in vivo, and further research is needed [5].

Overall, preclinical data indicate that horse milk contains biologically active substances that may positively influence

Clinical Evidence

Clinical data remain limited, mostly consisting of small pilot and

observational studies from regions where kumis is traditionally consumed.

Use in Gastrointestinal Diseases

Most clinical evidence relates to kumis use in chronic gastritis, gastric ulcers, and intestinal microbiota disorders. Observations suggest that regular kumis consumption normalizes gastric acidity, improves appetite, and enhances general well-being. Additionally, reductions in Helicobacter pylori-associated with gastritis and gastric cancer-have been reported, although data come from small cohorts and require confirmation [6,7].

Effect on Microbiota

Kumis is a natural probiotic containing lactic acid bacteria and yeasts that help restore gut microbiota balance, especially after antibiotics or chemotherapy. Children treated with antibiotics showed improved microbial diversity and immune parameters when consuming horse milk [8].

Immune Support and General Condition

Some Mongolian and Kazakh studies report improvements in hemoglobin levels, body weight, and overall condition in patients consuming kumis after infectious and chronic diseases. These findings are mainly empirical and traditional but provide a foundation for future trials [9].

It should be noted that no randomized controlled trials have yet evaluated horse milk or kumis in oncology patients, leaving efficacy and safety questions open.

Immunomodulation and Probiotic Effects

The combined influence of horse milk and kumis on immunity and microbiota is of particular interest. Protein fractions include immunoglobulins, lactoferrin, and lysozyme that help defend against pathogens and modulate immune responses.

Fermented kumis contains live lactic acid bacteria and yeasts that support microbiota normalization, short-chain fatty acid synthesis, and suppression of pathogenic flora. For patients undergoing chemotherapy and prolonged antibiotic treatment, this may be especially beneficial [10].

The link between microbiota and immunity is well established, and balanced microbiota can improve tolerance to antitumor therapy and reduce inflammatory complications.

Prospects and Recommendations

Given their unique composition and properties, horse milk and kumis may be considered adjunct nutritional support components for oncology patients, particularly during rehabilitation and recovery phases.

They assist digestion, stimulate immunity, restore gut microbiota, and reduce inflammation. However, they should not replace main oncological treatments but rather complement them.

For wider clinical adoption, well-designed randomized studies, development of standardized products, and safety evaluations—especially in allergic and gastrointestinal sensitive patients-are necessary.

Conclusion

Horse milk and kumis are traditional products with a rich history, valuable biochemical composition, and proven biological effects. Preclinical and preliminary clinical data support their potential as supportive therapies, especially in oncology and rehabilitation.

Nevertheless, further research involving larger patient cohorts and rigorous controls is needed to confirm efficacy and safety.

The integration of traditional knowledge with modern scientific approaches may lead to new nutritional products based on horse milk, capable of improving patient quality of life and complementing existing treatments.

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