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Goat and Sheep Milk

The challenge of cow milk protein allergy

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Abstract

Hypersensitivity to cow milk proteins is one of the main food allergies and affects mostly but not exclusively infants, while it may also persist through adulthood and can be very severe. Different clinical symptoms of milk allergy have been established. The diagnosis of milk allergy differs widely due to the multiplicity and degrees of symptoms, and can be achieved by skin or blood tests. Cow milk contains more than 20 proteins (allergens), that can cause allergic reactions. Casein fractions and β-lactoglobulin are the most common cow milk allergens. Human milk is free of β-lg, similar to camel milk. On the contrary, β-lg is a major whey protein in cow, buffalo, sheep, goat, mare and donkey milk. Caseins in milk of the different species differ in fraction number, amino acid composition, and their peptide mappings. β-Casein is the major fraction in goat casein, which is similar to human casein and different from cow casein. The peptide mappings of goat α-la and β-lg are completely different from those of cow milk. Different procedures can reduce the allergenicity of cow milk proteins by heat or enzymatic treatment to some degree. Allergies to milk proteins of non-bovine mammals have also been documented due to cross-reactivity between cow milk proteins and their counterpart in other species, and even between goat and sheep caseins. Genetic polymorphisms of milk proteins play an important role in eliciting different degrees of allergic reactions. Goat milk lacking α-s1-casein, which is the main casein in cow milk, is less allergenic than goat milk with α-s2-casein, which is more typical for many goat breeds. Several studies have reported real and dramatic

benefits from using goat, camel, mare or even soy milk as alternatives in cases of cow milk allergy and they can be considered hypoallergenic. However, therapeutic benefits vary with the degree of severity of the allergy and may be only around 60% of all cases, since other studies revealed allergenicity to occur also for any of those other milks.

Keywords: Cow milk allergy; Goat milk proteins; Sheep milk proteins; Allergenicity; Human milk substitutes