Benefits of Salivary vs Serum Food Intolerance Testing

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Background

Research in humans has shown that the key to delayed, or latent, or pre-clinical food sensitivity testing is the identification of the offending IgG or IgA antibodies and immune complexes in serum or feces, and the offending IgA or IgM antibodies in saliva. In fact, antibodies to food ingredients can appear in the saliva before the clinical or gastrointestinal biopsy diagnosis of inflammatory bowel disease or "leaky gut syndrome" is made in human patients. Saliva testing can thus reveal the latent or pre-clinical form of food sensitivity. A similar elaboration of IgA or IgM antibody in saliva but not serum pertains to animals with latent or pre-clinical gastrointestinal disease.

Delayed sensitivities are usually revealed as soon as 2 hours or as long as 72 hours after eating, which is the reason it can be difficult to connect the symptoms with a food or foods eaten as long as several days previously. There is a very high correlation between delayed food sensitivity and the amount and frequency of the food consumed.

In serum testing, food sensitivity reactions in the gut lead to increased blood levels of IgA or IgG directed to these food ingredients. Similarly, the immune complexes being formed from food reactions in the blood adhere to red blood cells and these altered blood cells are then cleared by the body's recticuloendothelial system in the liver and spleen. Individuals having more immune complex on their red blood cells are the ones who suffer from chronic food sensitivities.

In saliva testing, deposition of food antigens or peptides in the gut has been documented in people and animals to lead to the production of IgA or IgM antibodies in the serum and in secretions such as saliva. In some situations, IgA or IgM antibodies to food ingredients appear in saliva but are not present in serum. So salivary antibodies serve as an indication of a general mucosal immune response and can be induced in people and animals without parallel antibodies being detected in serum.

A good correlation exists between the saliva/ blood ratio of substances and salivary pH. Salivary flow rate and any existing pathophysiology of the oral cavity have also been shown to affect salivary distribution of substances. Saliva content of antigens and antibodies reflects the nutritional and metabolic status of the body, as well as the emotional, hormonal, immunological status of the individual animal.

Examples in Animals

Food sensitivity testing for common offending allergens and peptides in dogs can be achieved. The sensitivity and testing is for grains most often associated with inflammatory bowel disease and other symptoms of adverse food reactions – such as, but not limited to wheat and other glutens, corn and soy. These three grain types are among the major constituents (top 5 ingredients) that make up the bulk of standard commercial kibble fed to most dogs. Another common allergen in pet foods or animal food compositions is beef, and the testing and screening is also directed to but not limited to other meats, fish, dairy, eggs, other grains, botanicals, oils from seeds or fish, botanicals, vegetables, nuts, or fruit.

A primary example of an immunologic food sensitivity or intolerance is sensitivity to wheat or other gluten foods, for example barley, rice, millet, and oats. In the Irish Setter breed, for example, wheat-sensitive enteropathy is an heritable condition. Immunological reactions to gluten foods causes atrophy of the intestinal villi and inflammation of the small intestine, which, in turn, results in diarrhea and weight loss from malabsorption of fluid, electrolytes, and dietary nutrients. Even though chronic or intermittent

diarrhea and intermittent vomiting are the most common symptoms of this food sensitivity, there have been few studies of the prevalence of this condition in animals being presented to veterinarians with chronic diarrhea or vomiting or other common gastrointestinal symptoms. Furthermore, beyond costly measurements of serum IgE –mediated antibodies, there are no adequate methods in veterinary medicine to diagnose or noninvasively test for immunologic food sensitivities or intolerance. This frequently results in either no diagnosis or the missed diagnosis of an immunologic food sensitivity or intolerance.

Despite this situation, many animals with gluten or other food sensitivity or intolerance do not have diarrhea or weight loss, but instead have other signs and symptoms such as vague abdominal pain, nausea, abdominal bloating, flatulence, chronic fatigue, constipation, poor growth and maturity, iron deficiency anemia, osteoporosis, seizures or other neurologic disorders, or even just elevated serum liver enzyme levels. Some animals may be asymptomatic.

Furthermore, animals with gluten or other food sensitivity or intolerance may not have fully developed intestinal lesions. Therefore, the immunologic food sensitivity or intolerance of these animals may not be properly diagnosed using known testing methods, such as endoscopic intestinal biopsy and blood or serum testing. Additionally, these animals may present with other immunologic diseases such as the autoimmune diseases of skin, liver, joints, kidneys, pancreas, and thyroid gland, or microscopic colitis.

Saliva testing for food sensitivity and intolerance in animals differs significantly from all other food allergen tests available for use in animals. It is highly reproducible and clinically relevant. In serum, the food antigen or peptide being tested, and any specific IgA or IgG antibody in serum bind to each other and then fix complement. In saliva, the food antigen or peptide being tested reacts directly with the IgA or IgM antibody in the test animal's saliva.

Delayed food-related sensitivities begin in the gastro-intestinal tract when the intestinal lining becomes hyperpermeable. This problem is known as "leaky gut syndrome" or intestinal dysbiosis, and is defined as an increase in permeability of the intestinal mucosa to partially digested protein macromolecules, micromolecules, antigens and toxins. The immunological reaction to these proteins or other molecules in the liver initiates and perpetuates chronic food sensitivity or intolerance. When the gut is unhealthy, the rest of the body is unhealthy. The disease process that ensues is typically chronic or intermittent and often involves the gut and skin, as well as internal organs such as the liver. Gastro-intestinal tract function is disrupted when the lining of the gut is inflamed or damaged. With a leaky gut, large food antigens can be absorbed into the body. The body's defense systems then attack this antigen or antigens and the result is the production of antibodies against what was once a harmless, innocuous food ingredient. These IgA or IgG antibodies and immune complexes are formed in the bloodstream and circulate throughout the body where they can damage other tissues along the way. In saliva, these reactants are typically IgA or IgM.

Comments on Saliva vs Serum Testing in People

Saliva hormone or food antigen testing is a new technology. It's been used only in the last decade and, therefore, is not yet widely accepted by the medical community. Saliva testing also is not readily available in many laboratories. Furthermore, there's room for human error when gathering the saliva sample, as food or blood can easily contaminate the specimen.

The good news is saliva collection is noninvasive, painless, relatively inexpensive and convenient for the patient. When comparing saliva and serum methods, published studies have shown a saliva sample is more accurate than a serum sample.

For this reason, measurement of saliva IgA, IgG, and IgM antibodies against specific antigens of foods, intestinal bacterial and fungal flora is of considerable importance in the pathogenesis of immunologically mediated diseases, including food allergies or intolerance and autoimmunities.

Secretory IgA is capable of functioning as a blocking antibody, which can create a barrier to certain macromolecules, bacteria, and viruses. The interaction with secretory IgA will not permit such antigens to interact with the mucosa and blocks their entrance and exposure to the gut-associated lymphoid tissue. This blockage permits the host to shield efficiently the systemic immune response, local immune response, or both, from being bombarded by many molecules. An additional role of secretory IgA is prevention of diffusion of food antigens into mucous membranes.

Unlike the immediate effects of IgE-mediated allergy, the IgG and IgA-mediated food allergy and intolerance reactions can take several days to appear. Levels of IgG and IgA antibodies in the blood against different food antigens have been used for demonstration of delayed food allergy and intolerance reactions. Therefore, raised serum or plasma IgG and IgA levels of food-specific antibodies are often associated with food allergies. However, measurement of IgG or IgA in the blood may miss abnormal immune reaction to many food antigens. In one instance, it is known that oral or intragastric administration of dietary soluble proteins such as bovine gammaglobulin (BGG) and ovalbumin or egg albumin results in salivary IgA production, but not in any antibody production in serum.

The deposition of antigens in the gut has been shown to lead to the production of IgA antibodies in secretion at sites distant from the gut, such as colostrums, lacrimal and salivary secretions in man and salivary secretions in rhesus monkeys and in rats.

A general conclusion, therefore, is that the secretory immune system can be stimulated centrally and that precursors of IgA-producing cells migrate from the gut-associated lymphoid tissue to several secretory sites in addition to the lamina propria of the gut itself. Therefore, if antigens are injected into the submucosal tissues, they are likely to induce serum IgG antibodies as well as secretory IgA antibodies in saliva. However, if it is applied topically to the skin or to the intraepithelial tissue, secretory IgA is the main product, which is detected in saliva. The role of topically applied antigen in the localization and persistence of IgA responses has been demonstrated in several secretory sites, including the respiratory tract, oral cavity, gut and vagina.

More Specific Information

Saliva is a source of body fluid for detection of an immune response to bacterial, food, and other antigens present in the oral cavity and gastrointestinal tract. Indeed, salivary antibody induction has been widely used as a model system to study secretory responses to ingested material, primarily because saliva is an easy secretion to collect and analyze. It seems to be a general feature that salivary IgA antibodies can be induced in a variety of species in the absence of serum antibodies. This has been demonstrated after immunization with particulate bacterial antigens in humans that could selectively induce an immune response to Streptococcus mutans by oral administration of the antigen. This route of administration resulted only in antibody production in saliva and not in serum. Similar mucosal immune response in the form of saliva IgA did occur in monkeys, rabbits, rats, and mice after oral administration of Streptococcus mutans, Staphylococcus or different viral antigens and peptides.

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