

Effects of FORZA10 on conjunctival flogosis  
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## INTRODUCTION

### **ALLERGIC CONJUNCTIVITIS**

Allergic conjunctivitis in cats and dogs may represent a local conjunctival manifestation or a general reaction associated with skin hypersensitivity (9).

**CLINICAL SIGNS:** allergic conjunctivitis is characterized by hyperaemia and bilateral conjunctival oedema, intense itch and therefore eyes rubbing, has watery eyes and discharge (4). In an animal with conjunctivitis, we can also observe flogosis around both eyelids (marginal blepharitis) and of the cornea (keratitis), as well as secondary bacterial infections (caused by staphylococcus, in particular) (8) (9).

Allergy caused conjunctival flogosis is one of the clinical signs commonly found of IgE mediated atypical dermatitis in dogs (7). In cats, instead, conjunctivitis caused by general allergic reactions is associated with food hypersensitivity and causes intense itch on the head and neck, erythemic wounds and scabs on the eyelids, face excoriations, cheilite and ceruminosa otitis (1). Sometimes just an anamnesis and clinical aspects are sufficient to diagnose allergy related conjunctivitis, but in complicated and chronic forms these might not be sufficient and other diagnostic auxiliaries (such as cytology, conjunctival cultures or biopsy) are suggested.

**MICROSCOPIC ASPECT:** A conjunctival biopsy may reveal flaky epithelial cell and goblet cell hyperplasia or metaplasia. Allergy related flogosis is usually characterized by infiltrated red blood cells in the epithelial and connective subepithelial tissue and by the presence of a few mast cells. Inflammatory infiltrates of lymphocytes and plasma cells represent the predominant cell population (6) (14) (15).

### **EYE ALLERGY PHYSIOPATHOLGY**

Allergen sensitisation represents the first step in developing a defensive reaction: after an initial exposure all cells presenting this antigen (macrophages) phagocyte and process the antigen and they present it to the lymphocytes. Once the sensitisation has taken place, the immune system uses the most efficient response: repeated contact with the antigen transforms the B-lymphocytes in plasma cells, where IgE synthesis takes place. The connection between IgE and allergen provokes mast cell degranulation (allergic reaction type I) and the consequent liberation of inflammatory mediators such as histamine (10). Mast cells can be found in different tissues: skin, conjunctive mucus, nasal, bronchial and intestinal (13).

Eye mast cells originate from the hemopoietic system and especially a high number of mast cells are found in the conjunctiva, in which each contain a certain amount of IgE molecules. Mast cell degranulation in the conjunctiva is responsible for allergic reactions (1).

During the immediate allergic phase, histamine stimulates different districts of the ocular structure: nerve terminations determine an intense eye itch, which causes vase dilatation of peripheral vascularization therefore causing conjunctival hyperaemia and last, structural glands produce excessive tears (10) (17).

From 6 to 12 hours after mast cell degranulation, an afflux of red blood cells, macrophages, T lymphocytes from the blood current to the conjunctival mucus: This represents the secondary response phase. As a result, an allergic reaction implicates a simultaneous inflammatory

reaction characterized by the presence of flogistic cell infiltrate in target organ mucus (22) (16). Chemical mediators are freed during repeated stimulation of the local immune system, which play an important role in mucus flogistic reactions as well. Cytokines, toxic for the epithelial tissue in the cornea and conjunctival area and for the lachrymal film, are actually able to induce qualitative changes on film mucus and is the cause of disorganized lipidic film. So during a chronic allergy-related conjunctivitis, contrary to what happens during an acute form, the eye appears to be dry, with a lower mucus cell density in the eyelid conjunctives and has a reduced break-up time in the lachrymal film (11) (18). Cell infiltrate in chronic conjunctivitis is characterized by lymphoid cells that are responsible for hyperplasic follicle development, visible on a macroscopic level (follicle conjunctivitis) (5) (6).

### **ALLERGY RELATED CONJUNCTIVITIS**

Organisms can have inappropriate reactions to food ingestion: either food intolerance, characterized by a non-immunologic response or food hypersensitivity, when caused by an immunologic response. We do not yet know what exactly causes food allergen absorption to determine intestinal or skin sensitivity (6). The most common immunologic mechanism involved in all forms of food allergy is immediate hypersensitivity type I, since it is possible to observe specific IgE antibodies for food in serum (1) (6). However, other types of food allergies were recognized as involving immunopathologic reactions as types III and IV (6) (11) (12) (13).

Allergens ingested with food, called trophoallergens, are still difficult to identify and vary in different geographical areas based on how pets are fed. The most allergenic food is those high in protein content, although the list of food varies depending on the animal's eating habits. The types of food eaten most often and for the longest period of time are those most probably responsible for causing hypersensitivity (1). The ingredients involved in food intolerance in dogs are beef, bovine milk and cereal. The cases studied regarding cats are a limited number so we cannot fully determine which diet elements are involved and which exactly protein causes allergy (2).

The food additives usually incriminated are mostly haptens, small molecules that become allergenic when linked to a "carrier" protein. The most commonly used additives in industrially prepared pet foods are: sodium disulphate, sodium glutamate, azoici (food colouring), sodium arginate, vegetable gum, proylenic glycol and etossiquina (1). Even storage mites, found in industrially prepared dry food, can be one of the main reasons carnivores are sensitised by oral ingestion (1). In most cases, itch represents the most evident clinical sign, but other symptoms can be present as well: eritema, blubbles, facial dermatitis, external unilateral or bilateral otitis (3). Clinical manifestations in the conjunctival area of the eye are: hyperaemia, conjunctival chemosis, epiphora, intense itch and eye rubbing (4). Allergy-causing agents are not always identified, but the absence of other allergens and a response to therapy confirms a suspect diagnose (6). Food allergy diagnosis is mainly based on clinical improvement evaluation (reduced itch) after following an elimination diet and a relapse (12-72 hours later) when the animal is exposed to his previous diet. The suggested administration period is minimum 28 days (6).

### **CLINICAL OBSERVATIONS**

The aim of this study was to verify all the effects a pet food based on fish, pineapple and ginseng can have on conjunctival allergic reactions.

For this research we have selected cats and dogs presenting allergic conjunctivitis symptoms such as: conjunctival hyperaemia, chemosis, epiphora, and evident itch also involving the eyelids. Eye symptoms in some cases represent the only visible clinical manifestation, in some other cases, instead, it was associated to other skin or gastro-intestinal hypersensitivity problems.

All subjects examined have undergone an ophthalmic evaluation during which much attention was devoted to measuring tear production (measured with the Schirmer Test), tear duct accessibility and lachrymal film quality. Cornea and conjunctiva state, hyperaemia intensity and conjunctival chemosis, presence of edema or corneal neovascularisation and its transparency were evaluated by a slit lamp microscope exam and direct ophthalmoscope. In order to judge eye sufferance level and superficial corneal wounds we used colouring (Bengal pink and fluorescence) as an auxilium. The cytological exam of the conjunctiva and of the cornea by cytobrushing is necessary to determine the type of inflammation present and the existence of secondary bacterial infections. All subjects have undergone from day 0 to day 30 (first to last medical examination) a diet as therapy (**FORZA10 Medium Regular Diet** pet food based on fish, pineapple and ginseng). After this period we reintroduced their previous diet to verify any eventual clinical signs. Clinical evaluations took place after 10 and after 30 days from the first examination (day 0). For every check-up the evaluation criteria were: Schirmer Test, lachrymal film quality, conjunctival hyperaemia intensity, presence of itch in the periocular area and relation with other clinical signs when skin problems are also present.

### **EPIPHORA:**

**DOGS:** on day 0 88.4% manifested serosal epiphora (initial Schirmer value 17-26 mm). After 10 days of hypoallergenic diet the epiphora decreased in 54.3%, while in 19.5% it cleared completely. After 30 days of diet clinical results were the following: in 65.2% the epiphora disappeared, in 13% it decreased, while in 21.7% there was no difference.

**CATS:** 52.6% of the subjects had serosal discharge on the first examination. during the check-up after following the diet for 10 days eye discharge decreased in 50% and in 10% the symptom completely disappeared; at the end of the study epiphora decreased in 80% and disappeared in another 80%.

### **CONJUNCTIVITIS**

**DOGS:** 86.5% of the examined subjects had conjunctivitis on day 0. During check-up on day 10 after following a fish based diet, the conjunctival inflammation decreased in intensity in 35.5%. After 30 days all symptoms disappeared in 84.4%.

**CATS:** 84.2% presented hyperaemia and chemosis during their first examination. On day 10 in 25% of the subjects a decrease in symptoms was visible and in 37.5% symptoms disappeared. At the end of the observation period conjunctivitis disappeared in 81.25%.

### **BLEPHARITIS AND PERIOULAR ITCH**

**DOGS:** 65.3% of the subjects on day 0 presented periocular itch and inflamed eyelids. After following the diet for 10 days, blepharitis decreased in 23.5% and disappeared in 58.8%. After 30 days another 11.7% of dogs improved their condition while 82.3% healed completely.

**CATS:** 73.6% presented periocular itch and blepharitis on day 0. After 10 days of dieting in 42.8% there was a decrease in eyelid inflammation and in 14.2% it disappeared completely. After 30 days another 14.2% improved and 64.2% healed completely.

### **EYE AND SKIN SYMPTOMS**

**DOGS:** 69.2% of the subjects presented eye and skin symptoms on the first visit. 77.7% of these subjects improved after following the diet for 10 days and after 30 days in 77.7% the symptoms disappeared altogether.

**CATS:** 31.3% presented eye and skin symptoms on day 0. 66.6% improved after following the diet for 10 days. 83.3% healed completely at the end of the observation period.

### **FINAL CONCLUSIONS**

The nutritional therapy, consisting of a fish, pineapple and ginseng pet food (**FORZA10 Medium Regular Diet**) was a remarkable aid for symptom regression (eye inflammation and dermatological problems). We observed a slight decrease in itching and flogistic component.

Subjects with eye discharge and conjunctivitis better responded to therapy rather than those with epiphora as the only symptom.

Reintroducing the animal's previous diet caused a relapse within 3 days in almost cases. The first symptom to reappear in the majority of cases was periocular or general itch; only in a few cases the first symptom was excessive tear discharge.

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