Feline atopic dermatitis
What is similar to canine & human atopic dermatitis?

Klaus Earl Loft, DVM
Resident dermatology
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College of VETERINARY MEDICINE

Intro

- ✓ History
  - ✓ Human
  - ✓ Feline
  - ✓ Canine
- ✓ Feline atopic disease
- ✓ Pathogenesis
- ✓ Epidemiology
- ✓ House dust mites
  - ✓ background
  - ✓ Clinical signs
- ✓ Diagnostics
- ✓ Treatment
- ✓ Future directions

House dust mites I

- ✓ *Dermatophagoides farinae (D.f.)*
- ✓ *Dermatophagoides pteronyssinus (D.p.)*
  - ✓ Allergens (HDMA):
    - ✓ *D.f. 1, D.f.2, D.f 15 …..*
    - ✓ *D.p.1, D.p.2…*

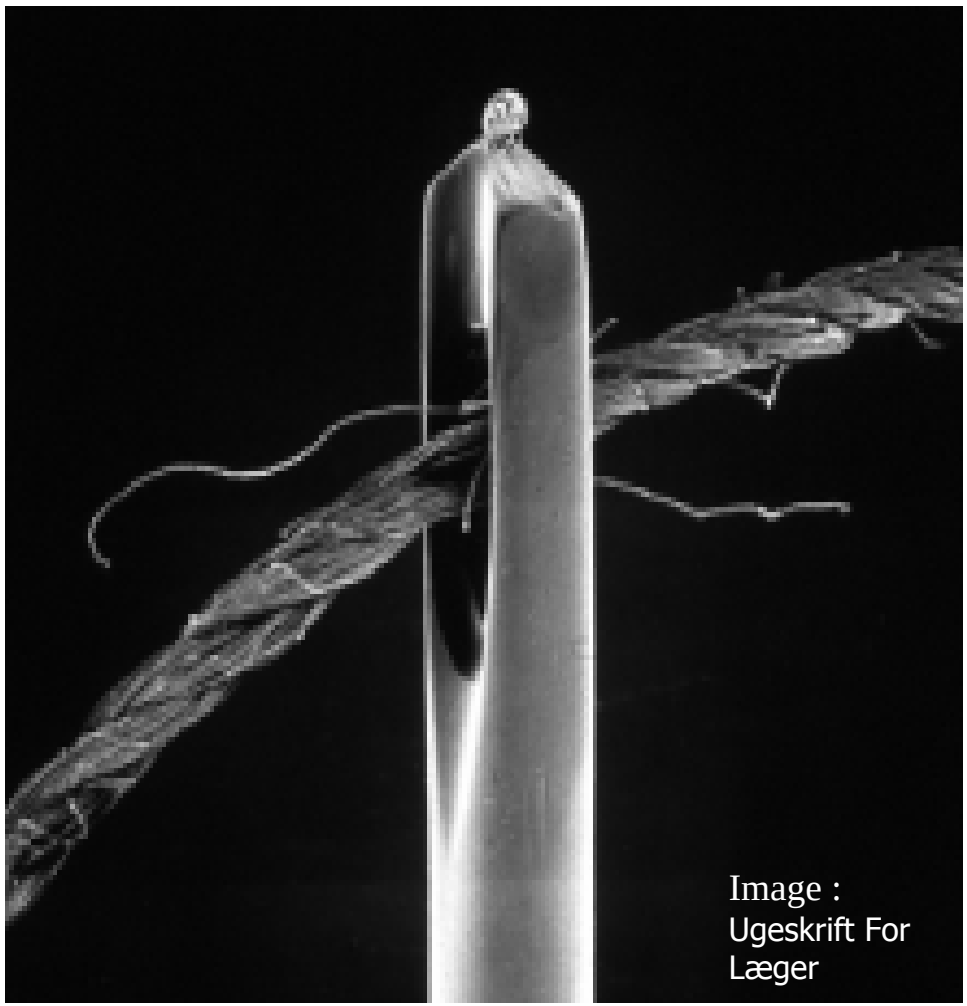
    (McCall et al Vet Immun & immunopathol.2001)
- ✓ Storage mites
  - ✓ *Tyrophagus putrescentiae (T.p.)*
  - ✓ *Acarus siro (A.s.)*

- ✓ Since 1964 important factor in human AD

(H.Mosbech, Ugeskrift For Læger,1999 vol 161, p414-18)

- ✓ Canine since early 1970's
- ✓ World wide present
- ✓ Humans more frequently AD/asthma with *D.p.*
- ✓ Dogs more AD with *D.f.*
- ✓ How is this in cats?

House dust mites II



- ✓ Color less small 0.3 mm long
- ✓ Feeds on dander from humans, dogs; cats?
- ✓ Optimum conditions 25 °C (77 F), 70~ RH%
- ✓ But they will adapt to low temperatures and can survive with lower RH%
- ✓ < 50 RH% w temp >20 °C (68 F)
- ✓ Immobilized at 4 °C
- ✓ Killed by washing at temperatures >55 °C (130 F)

HDMA (L. Arlian et al Current allergy 2002)

- ✓ Where in the homes?: fabric covered furniture, bedding = microenvironments where the RH% will provide water enough.
- ✓ 100 mites/gram of dust ~ 2-10 µg of group 1 HDMA = significantly ⬆ risk for sensitizations in genetically predisposed individuals
- ✓ Seasonal blooming in numbers of mites
- ✓ HDMA still present after mites are dead!

Background

- ✓ Feline Atopic dermatitis
- ✓ 1st case of feline atopic dermatitis 1982
  (Reedy et al, JAAHA, 1982)
- ✓ Defined in 1989 by Halliwell as:
  (Vet. Clinical immunology p.232-52)

"An inherited predisposition to develop IgE antibodies to environmental allergens, resulting in allergic disease"

Feline atopic dermatitis

- ✓ Pruritic dermatologic disease
- ✓ No sex or breed predisposition?
- ✓ Age 6-24 months (6 months to 14 yrs)
- ✓ Major group of allergic cats

  (Scott, Miller & Kirk, p.602, P.J. Roosje et al Vet immun & Immunopathol. 2004)

  - ✓ Non-seasonal (50-90%)
  - ✓ Pollen allergies are rare

A clinical diagnosis!

Human atopic dermatitis (atopic eczema)

"One definition":

A genetic chronic relapsing inflammatory skin disease with a "Tendency to develop IgE antibodies to commonly encountered environmental allergens & subsequent of disease" frequently with elevated IgE levels.

- ✓ First described clinically in 1808
- ✓ In 1892 first association between hayfever & AD
- ✓ In 1923 Coca and Coke termed the term **ATOPY** & in 1939 the term Atopic dermatitis was coined to bring together all the group of atopic diseases.
- ✓ Type I hypersensitivity reaction (immediate)
- ✓ Considered "a genetic dysfunction of immune system"
  (V.S. Beltrani et al, Derm online J, Vol 9(2)2005)
- ✓ The exact pathogenesis still not clear……..

Canine Atopic Dermatitis (cAD)

The ACVD Task Force on Canine Atopic Dermatitis, 2001

- Pruritic skin condition
- Relapsing dermatitis
  - Bacteria/Yeast
- HDM most common allergen
  (ACVD task force on cAD, 2001)
- Seasonal/non-seasonal
- Breed & familiar predilection

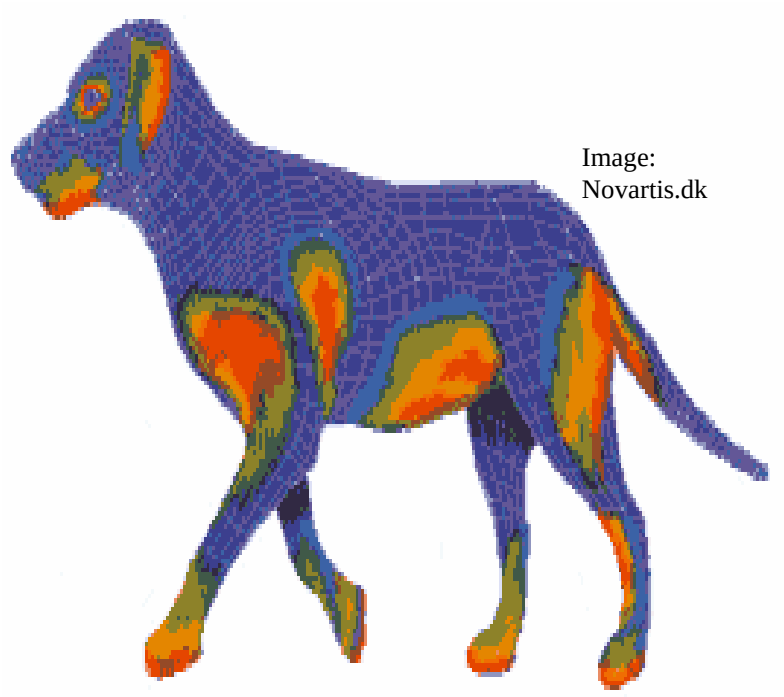


Image:
Novartis.dk

Definition:"A genetically-predisposed inflammatory & pruritic allergic skin disease with characteristic clinical features. It is associated most commonly with IgE antibodies to environmental allergens

Epidemiology of AD

Canine

- ✓ Approx. 10-15% of dog population
- ✓ Age:4 months-7 years (70% ≈1-3yr)
  - ✓ ↑ prevalence
  - ✓ More cases diagnosed?
- ✓ Genetic selection?
- ✓ More severe clinical manifestation?

Feline

- ✓ Incidence ?
- ✓ Age: 6 months to 8 years
- ✓ Rare in older Fe.
- ✓ Increase in frequency?
- ✓ Increase in severity?

Human

- ✓ Children 10-20%
- ✓ Adults 1-3%
- ✓ Rare > 50 yr.
  - ✓ ↑ prevalence in developed countries
- ✓ More severe clinical manifestation ?
- ✓ Hygiene hypothesis

Genetics and AD

- ✓ Genetic abnormalities reported in humans
- ✓ Little is known in dogs
- ✓ 3 cases of litter mates (K.Moriello, Vet Derm 2001)
- ✓ Abyssians (Bettenay, Proceeding AAVD,1998)

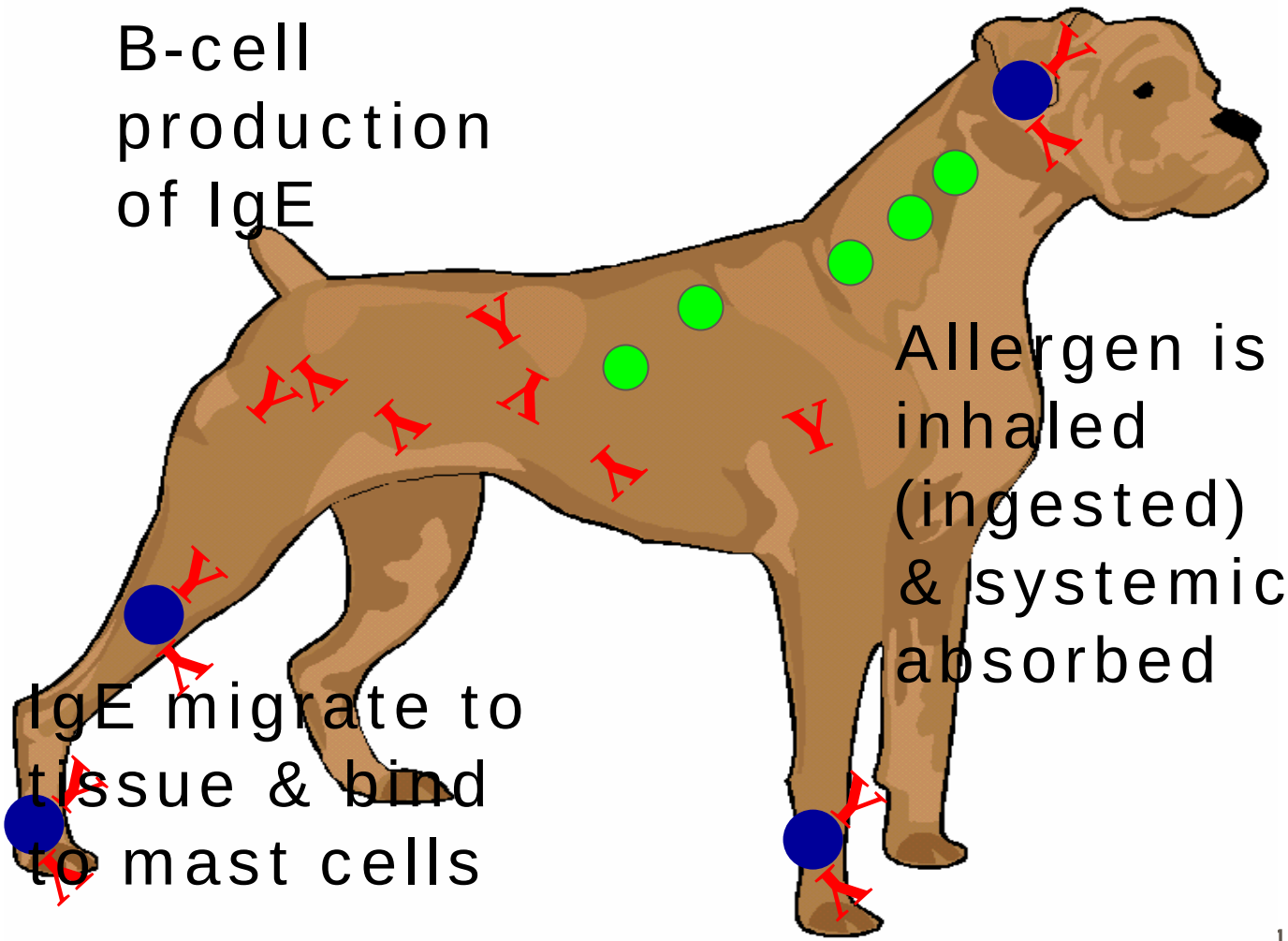
Canine AD	**Human AD**
•Familial history	**•Familial history**
•Strong breed predilection	**•Gene candidates**

Not much is known in cats!

Pathogenesis:Inhalation Route (allergic inhalant)

Y **IgE**

Allergen



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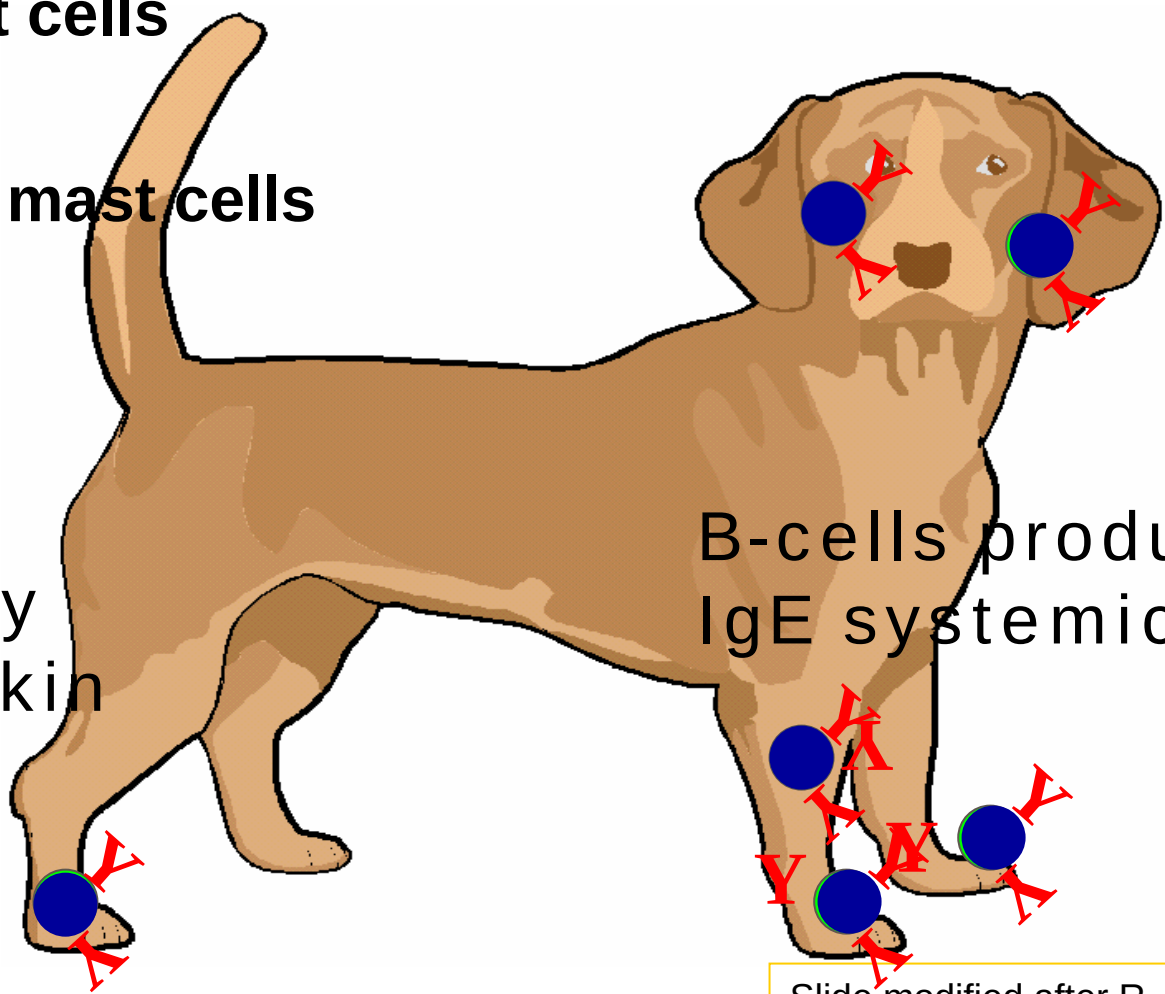
Pathogenesis: Percutaneous route

IgE & mast cells

Allergen

Activated mast cells



Allergen is captured by LC in the skin

B-cells produce IgE systemically?

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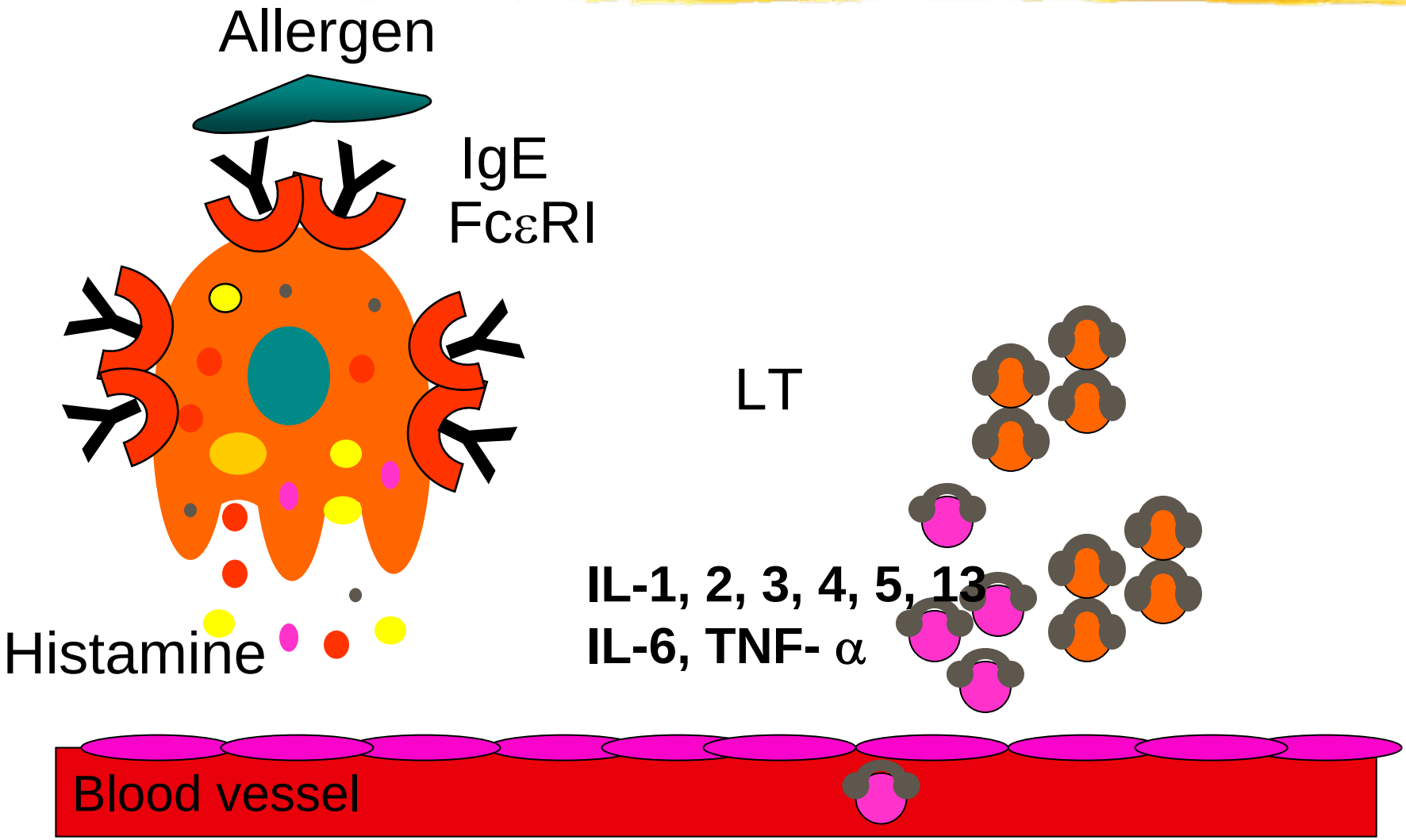
TYPE I HYPERSENSIVITY



Pathogenesis of AD?

The "new" theory:

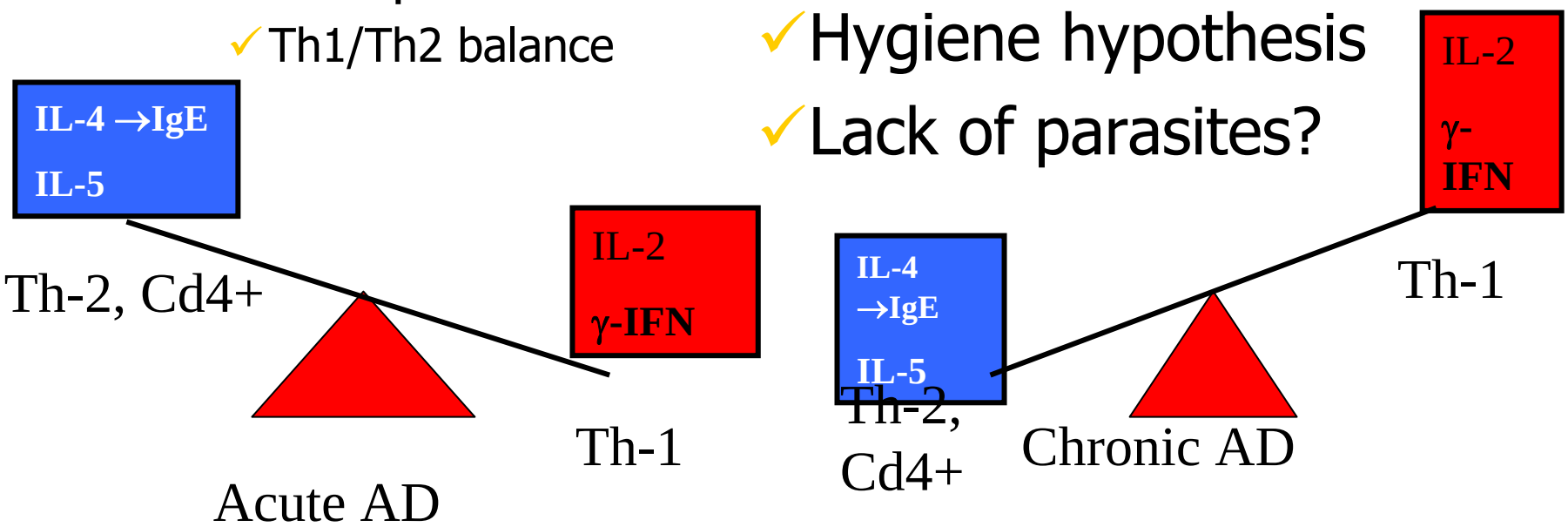
- ✓T cell imbalances
  - ✓Biphasic "switch" of T helper cells:
  - ✓Th1/Th2 balance

The "old" theory:

Type I hypersensitivity

IgE, mast cells, histamine, leucotriens

- ✓Hygiene hypothesis
- ✓Lack of parasites?



Role of IgE-

Canine AD

- ✓ Increased expression of surface bound IgE on LC in lesional skin (Olivry et al, 1996)
- ✓ Most dogs with AD have detectable serological allergen-specific IgE

Human AD

- ✓ LC capture allergen via their high affinity IgE receptor (FcεRI)

No difference between atopic and non atopic cats in a small study

(S.Gilbert et al. Vet immunol & immunopathol, 1998 vol. 63 p235-52)

SPF cats

- ✓ 15 spayed female non clinical AD cats
- ✓ 6 months old
- ✓ Sampled in mid September 2005
- ✓ HESKA tested for 24 allergens
- ✓ 6 cats positive for 1 or more allergens
- ✓ 1 Positive for fleas
- ✓ 14 positive allergens in 480 tested
- ✓ NO HDMA found in the cage room

Role of missing IgE ?

Canine AD

- ✓ IgE do not correlate with severity of disease
- ✓ No difference in serum total IgE between normal and atopic dogs
  (M.A. Fraser et al, vet rec. 2003 & Deboer et al ACVD task force)
- ✓ Negative IDT & serology in some dogs with clinical AD

Human AD

- ✓ Genetic inability to produce IgE may develop AD

Intrinsic AD

- ✓ 10-30% of humans with clinical AD do not have increased IgE levels
- ✓ Negative IDT/Patch test/ serology (total & specific)

If this is the explanation then……

Why do we see negative IDT & serology testing in some dogs with clinical signs of AD?

- ✓ Wrong season? testing
- ✓ Allergens not included in the panel test?
- ✓ Heterogeneity of IgE
- ✓ (Suppressive "Drugs") EFA, etc.

Why do we see positive IDT and serology testing in normal dogs with no signs of AD?

- ✓ IgE heterogeneity
- ✓ Yet to develop clinical signs
- ✓ Positive IDT and serology testing: a secondary criteria for diagnosis

Clinical signs of AD

Symptom	Human	k-9	Fe
Pruritus	++	++	++
Otitis	*	++	-
2° Alopecia	?	++	+++
2° Erythema => lichenification	+	+	-
Eosinophilic granuloma	?	-	+
2° pyoderma	+/-	+/-	-
Miliary dermatitis	-	-	++
Rhinitis/conjunctivitis	+	(-)	++/-
Asthma	+	-	+/-

Clinical picture Dermatitis

Canine

Feline

Miliary dermatitis

Human

Clinical picture: abdomen

Canine

Feline

Human

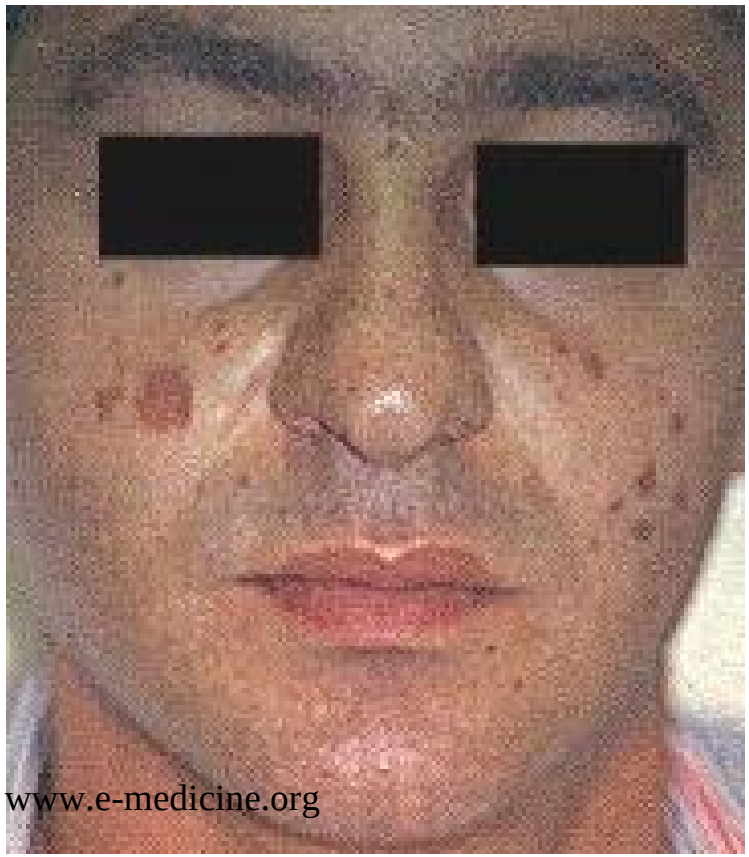
Clinical picture: Feet

Canine

Feline

Human

Clinical signs: face



Diagnostics

Anamnesis

- ✓ History
  - ✓ Familial?
- ✓ Clinical signs
  - ✓ +/- Non seasonal pruritus
  - ✓ Alopecia (symmetrical)
  - ✓ Miliary dermatitis
  - ✓ Eosinophilic granulomas
- ✓ Response to prednisolone

(C.Graham-Mize, WCVD5, 2004)

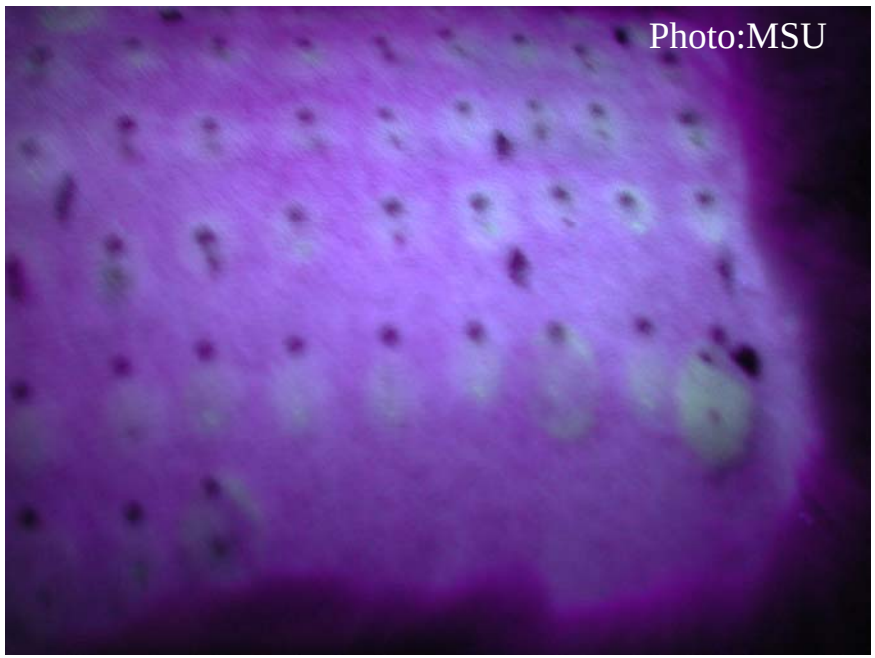
Rule out

- ✓ Parasites
- ✓ Fungal
- ✓ Bacterial
- ✓ Neoplasia/paraneoplasia
- ✓ Viral?
- ✓ Cutaneous adverse food reaction

Diagnostic tests

Intra dermal test (IDT)

- ✓ Flourescein 10%
  (S.J.Park et al, Aust. Vet Journal, Nov 2002)
- ✓ 4.4 mg/kg iv read with woods lamp
- ✓ To enhance the reading of the IDT



IgE Serology

- ✓ (RAST, ELISA, Liquid phase)

(K.Talinger et al Vet immunol & immunopathol. 2005)

- ✓ n=59 cats HDM AD
- ✓ Age 1-13 yr (5.1yrs)
- ✓ Compared IgE (*D.f & D.p)*
- ✓ Grouped (6) based clinical signs
- ✓ n.s. for both Group I & II IgE)

Treatment of feline AD

- ✓ Avoidance ??
- ✓ Prednisolone (Graham-Mize)
- ✓ Allergen Specific Immuno Therapy(ASIT)
- ✓ Antihistamine
- ✓ Essential Fatty Acid(EFA)
- ✓ (F. Kristensen et al, WCVD 2004)
- ✓ Cyclosporine (CSA)
- ✓ (Megestrol acetate)

Summary

1. CONSENSUS on the definition of AD
2. Acceptance of terminology
3. Uniform testing materials
4. Better understanding of the interplay between the genetics, allergens & the mechanism of disease

- ✓ Who do we test?
- ✓ Why do we test?
- ✓ How do we test?
- ✓ Does it make a difference?

- ✓ Questions?

Literature

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