

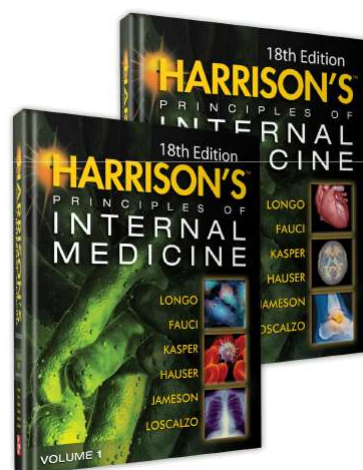
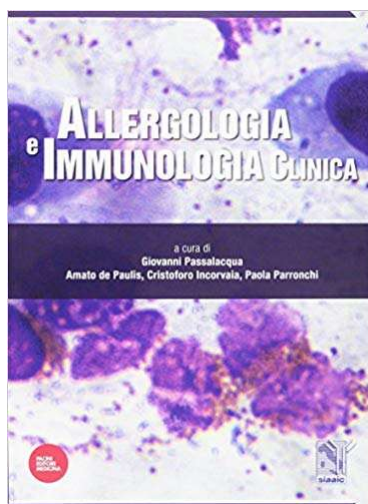


UNIVERSITÀ
DEGLI STUDI
DI FERRARA
- EX LABORE FRUCTUS -

CdL Medicina e Chirurgia
Insegnamento di Medicina Interna

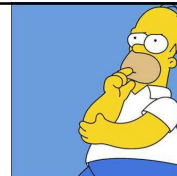
Introduzione all'immunologia clinica con particolare riguardo alle malattie allergiche

Giacomo Caio, MD, PhD
Assistant Professor of Internal Medicine
Department of Medical Sciences
University of Ferrara



Vi lascio le diapositive!!

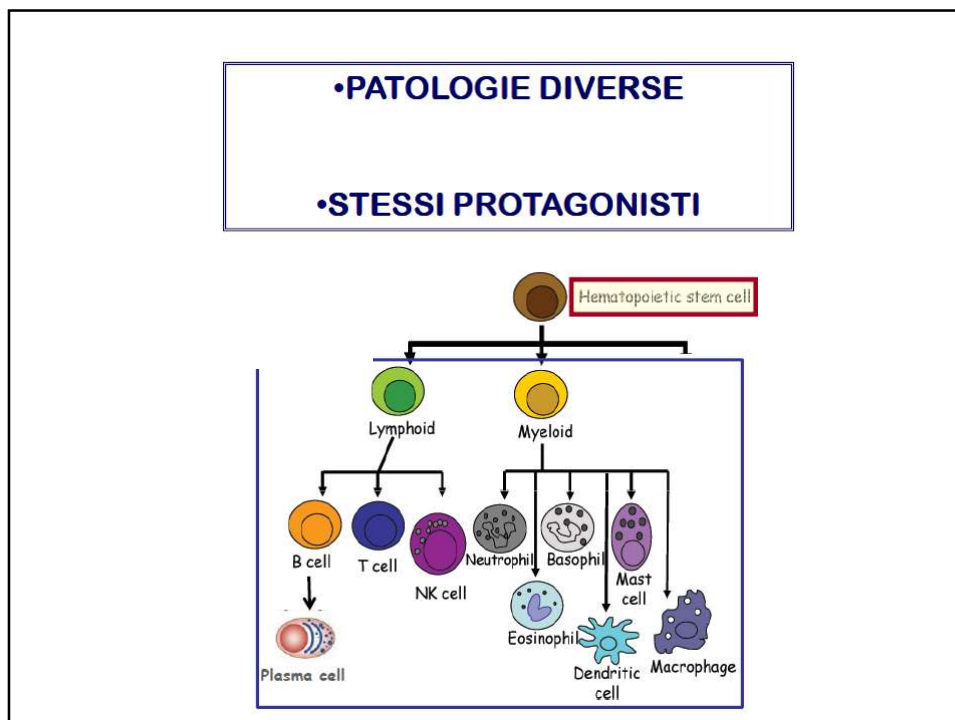
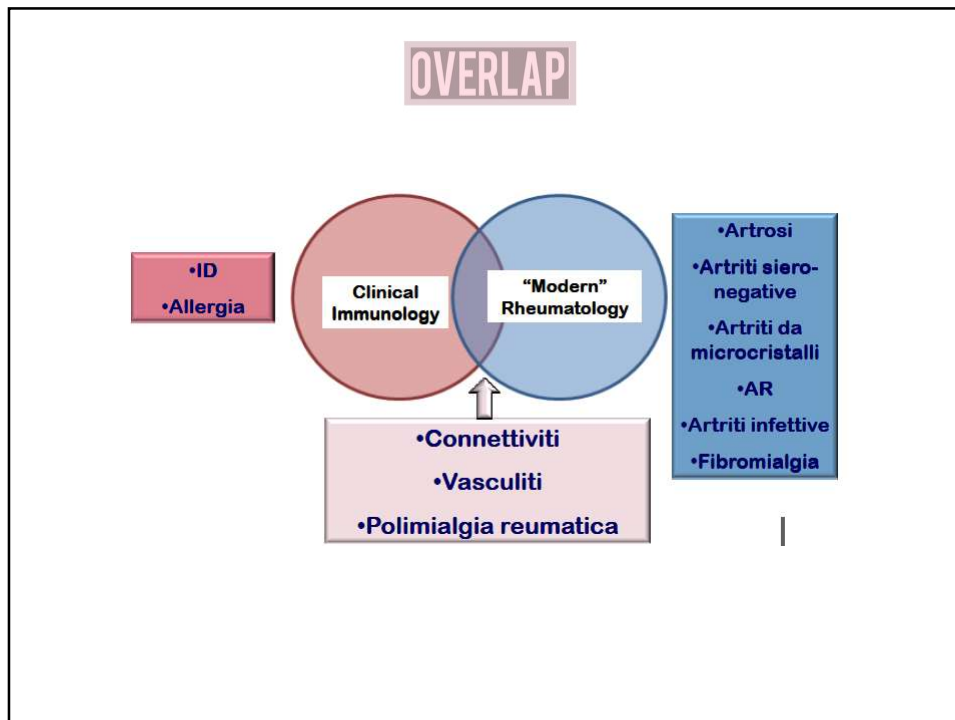
Cos'è l'immunologia clinica??



Immunologia Clinica si occupa di condizioni, in parte geneticamente determinate, nelle quali.....

Il Sistema Immunitario non è in grado di

- 1. di difenderci da agenti patogeni:**
immunodeficienze primitive e secondarie
- 2. di essere “indifferente” ad antigeni esogeni**
peraltro innocui (allergeni): **allergia**
- 3. di essere “indifferente” ad antigeni**
endogeni (self): **autoimmunità**



Correlazioni cliniche

Manifestazioni **pseudoallergiche** all'esordio o in corso di **malattie ematologiche** (Linfomi, leucemie)

Manifestazioni **pseudoallergiche** all'esordio in corso di malattie **immuno-reumatologiche** (LES)

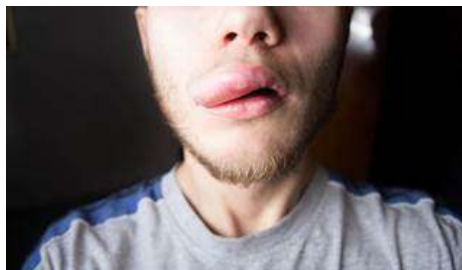
Manifestazioni **ematologiche** all'esordio o in corso di malattie **immuno-reumatologiche**

Esami Laboratorio

- Citopenie autoimmuni: LES, AEA...
- Anemia iporigenerativa: da flogosi (AR, LES...)
- Anemia perniciosa (megaloblastica): GCAA
- Ipereosinofilia: Churg-Strauss (vasculite piccoli vasi ANCA-associata)

Clinica

S. Orticaria - angioedema cronica in corso di Linfomi, Leucemie e molte malattie autoimmuni





ἄλλος
ἔργον



Clemens von Pirquet, MD
(1874-1929).

von Pirquet C. Allergie. Munchen Med Wehnschr 1906;53:1457.

ALLERGIA

diversa/alterata
reattività in senso
lato

ATOPIA

1923 *atopy* = reazioni di ipersensibilità immediata a tendenza "ereditaria"



Arthur F. Coca,



Robert A. Cooke

atopy, the in-herited human hypersensitiveness.

Coca AF, Cooke RA. On the classification of the phenomenon of hypersensitiveness. J Immunol 1923;8:163-82.

|

IgE

The Ishizakas, 1966



THE JOURNAL OF IMMUNOLOGY
Copyright © 1966 by The Williams & Wilkins Co.

Vol. 97, No. 1
Printed in U.S.A.

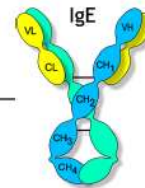
PHYSICO-CHEMICAL PROPERTIES OF HUMAN REAGINIC ANTIBODY

IV. Presence of a Unique Immunoglobulin as a Carrier of Reaginic Activity¹

KIMISHIGE ISHIZAKA, TERUKO ISHIZAKA AND MARGARET M. HORN BROOK

From the Children's Asthma Research Institute and Hospital, Denver, Colorado

WHICH IMMUNOGLOBULIN HAD SKIN-SENSITIZING ACTIVITY?



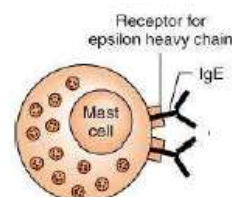
Bennich HH, Ishizaka K, Johansson SGO, Rowe DS, Stanworth DR, Terry WD. Immunoglobulin E, a new class of human immunoglobulin. *Bull World Health Organ* 1968;38:151-2.

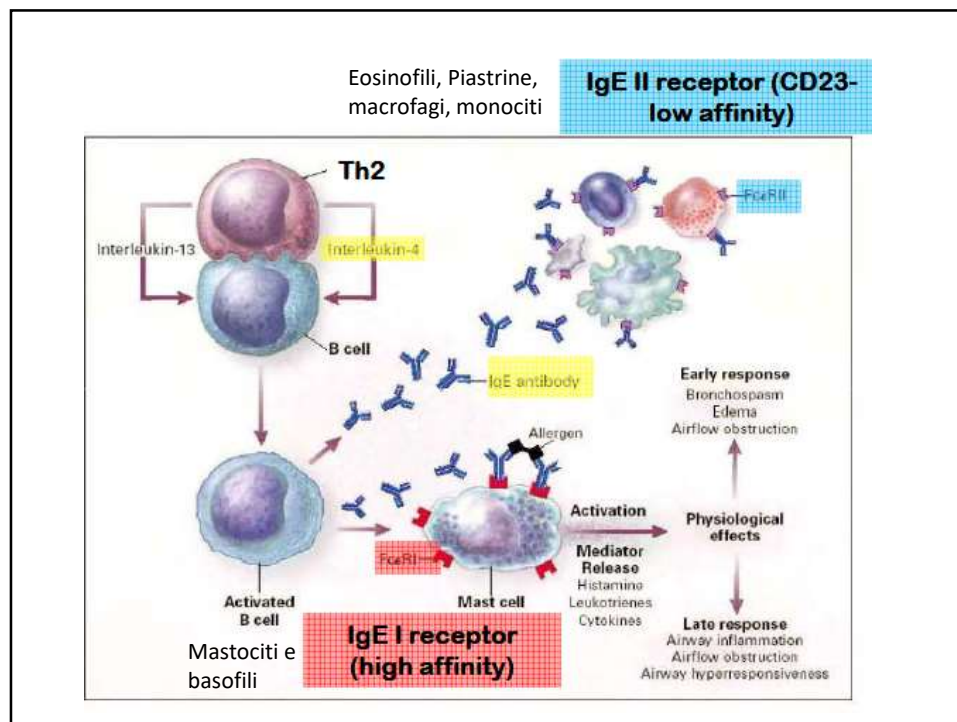
FIG 1. Drs Kimishige and Teruko Ishizaka.

Ishizaka K, Ishizaka T, Hornbrook MM. Physico-chemical properties of human reaginic antibody. IV. Presence of a unique immunoglobulin as a carrier of reaginic activity. *J Immunol* 1966; 97:75-85.

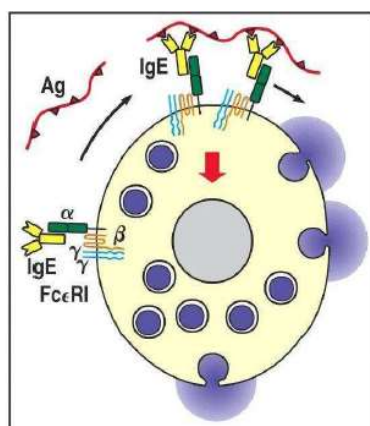
IgE

- IgE is the least common (< 110 UI/ml, nanograms) serum Ig since it binds very tightly to Fcε receptors on basophils and mast cells
- Involved in allergic reactions (IL-4)
- IgE does not fix C and does not cross the placenta





The high affinity IgE receptor (FcεRI): mast cells and basophils

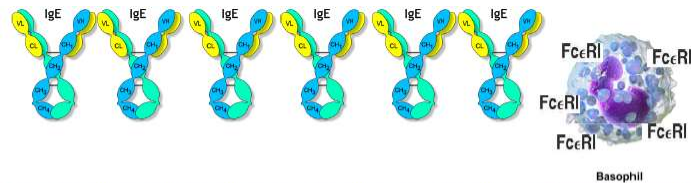


–IgE-FcεRI has the **highest affinity** of any Fc receptor with an **extremely low dissociation rate**

–Binding of IgE to FcεRI **increases the half life of IgE**

Figure 10.3 The Immune System, 2/e (© Garland Science 2005)

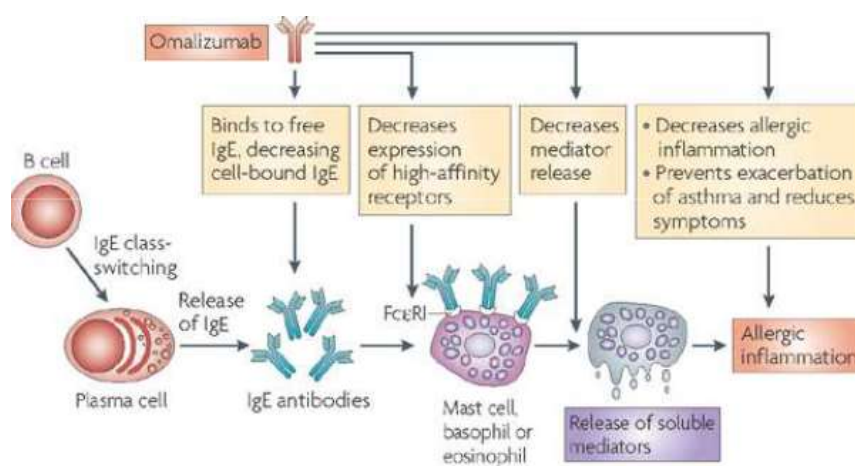
Altra particolarità del rapporto IgE FcεRI....



Immunoglobulin (Ig) E antibody has been shown to up-regulate the expression of the Fc receptor for IgE (FcεRI) on basophils and mast cells [1–7], and this process is manifested in a relationship between total serum IgE titers and expression of FcεRI on peripheral blood basophils [8–10].

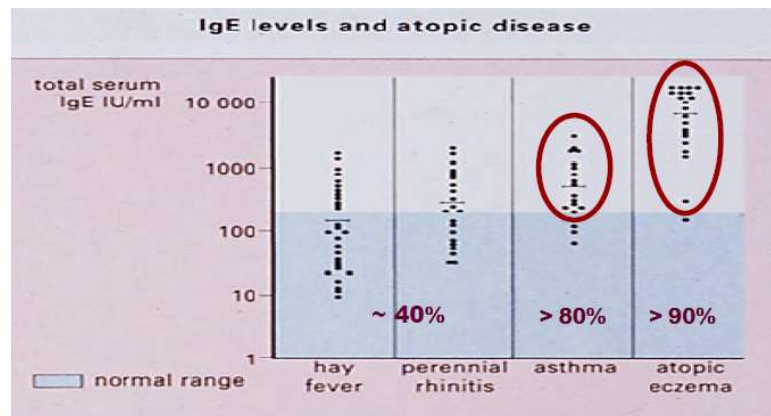
Questa caratteristica è stata sfruttata terapeuticamente...

Anti-IgE



Nature Reviews | Immunology

**Le IgE sieriche non sono sempre aumentate
nelle allergie!**



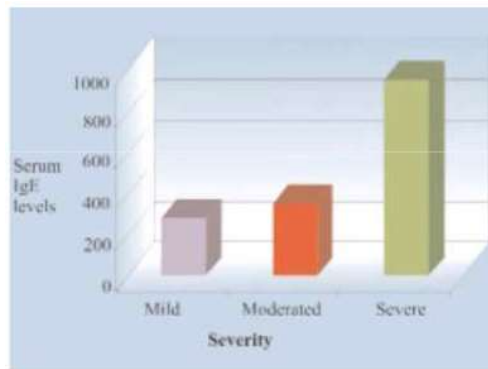
Atopic eczema



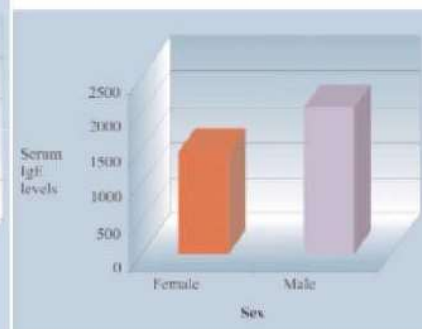
A typical patch of atopic eczema behind a knee.



Esiste una correlazione fra severità dell'eczema atopico e il livello delle IgE totali sieriche

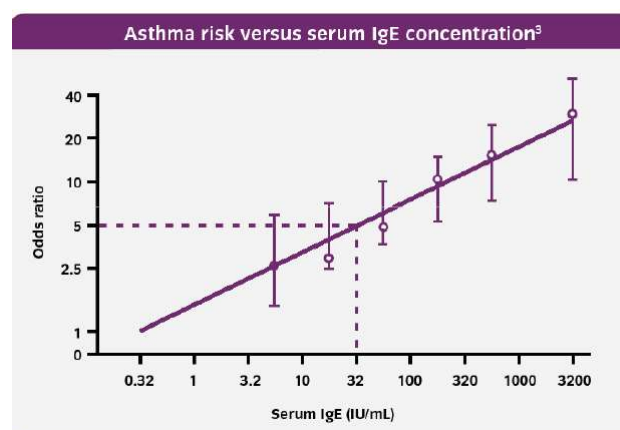


GRAPH 1: Severity of clinical manifestations according to serum IgE levels



GRAPH 2: IgE levels according to sex

Esiste anche una correlazione tra rischio di sviluppare asma e livelli di IgE totali sieriche





**ATTENZIONE
MESSAGGIO
IMPORTANTE**

Livelli elevati di IgE non solo allergie...

- Aspergillosi bronco-polmonare
- Infestazioni parassitarie (ascariasi, schistostomiasi)
- Infezioni virali (EBV, CMV, HIV)
- M. Tuberculosis
- Malattie ematologiche (Mieloma IgE, Hodgkin, GVHD)
- Vasculite di Churg – Strauss
- Immunodeficienze primitive (S. di Giobbe, Wiskott-Aldrich, Di George)
- Fumatori (+ nei maschi)
- Alcolismo
- Idiopatico
- ...

J Allergy Clin Immunol 201;125:S73:80

Functional activity	IgM	IgD	IgG1	IgG2	IgG3	IgG4	IgA	IgE
Neutralization	+	-	++	++	++	++	++	-
Opsonization	+	-	+++		++	+	+	-
Sensitization for killing by NK cells	-	-	++	-	++	-	-	-
Sensitization of mast cells	-	-	+	-	+	-	-	+++
Activates complement system	+++	-	++	+	+++	-	+	-

Figure 9-19 part 1 of 2 Immunobiology, 6/e. (© Garland Science 2005)

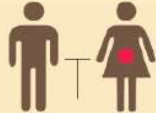
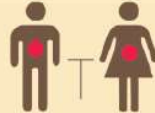
Distribution	IgM	IgD	IgG1	IgG2	IgG3	IgG4	IgA	IgE
Transport across epithelium	+	-	-	-	-	-	+++ (dimer)	-
Transport across placenta	-	-	+++	+	++	+/-	-	-
Diffusion into extravascular sites	+/-	-	+++	+++	+++	+++	++ (monomer)	+
Mean serum level (mg ml ⁻¹)	1.5	0.04	9	3	1	0.5	2.1	3×10 ⁻⁵

Figure 9-19 part 2 of 2 Immunobiology, 6/e. (© Garland Science 2005)

determinants of allergic diseases

H **F**amily
istory

Determination of allergy risk by family history

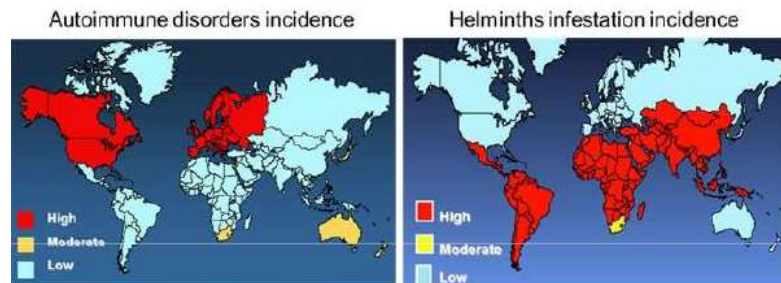
% of couples	Low risk 64%	Moderate risk 31%	High risk 5%
Family history of parents  = Parent with allergy			
% of babies with allergies 	10% to 15%	20% to 40%	30% to >50%

determinants of allergic diseases



Old friends for breakfast

The «hygiene hypothesis» for autoimmune and allergic diseases

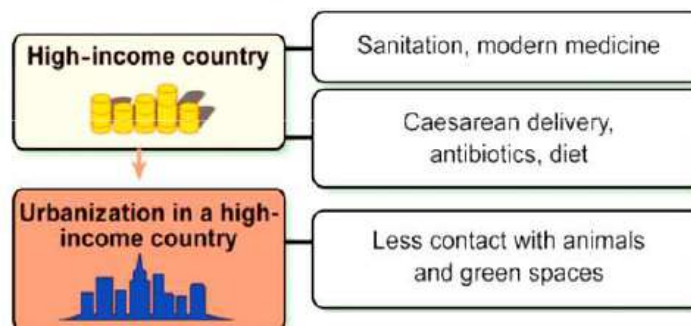


Personal communication from Dr. Joel Weinstock

There is increasing recognition that exposures to infectious agents evoke fundamental effects on the development and behaviour of the immune system. Moreover, where infections (especially parasitic infections) have declined, immune responses appear to be increasingly prone to hyperactivity. For

Clinical and Experimental Immunology 2014, 177: 1–12.

Progressive loss of immunoregulation



LEZ 11

Clinical and Experimental Immunology 2014, 177: 1–12.

Clin Exp Allergy. 2018 Sep 19. doi: 10.1111/cea.13280. [Epub ahead of print]

Enterovirus infection during pregnancy is inversely associated with atopic disease in the offspring.

Korhonen L^{1,2,3}, Seiskari T⁴, Lehtonen J¹, Puustinen L¹, Surcel HM^{5,6}, Haapala AM⁴, Niemelä O⁷, Virtanen SM^{8,9,10,11}, Honkanen H¹, Karjalainen M¹², Ilonen J^{13,14}, Veijola R¹², Knip M^{15,16,17,18}, Lönnrot M^{1,2,3}, Hyöty H^{1,4}.

Author information

Abstract

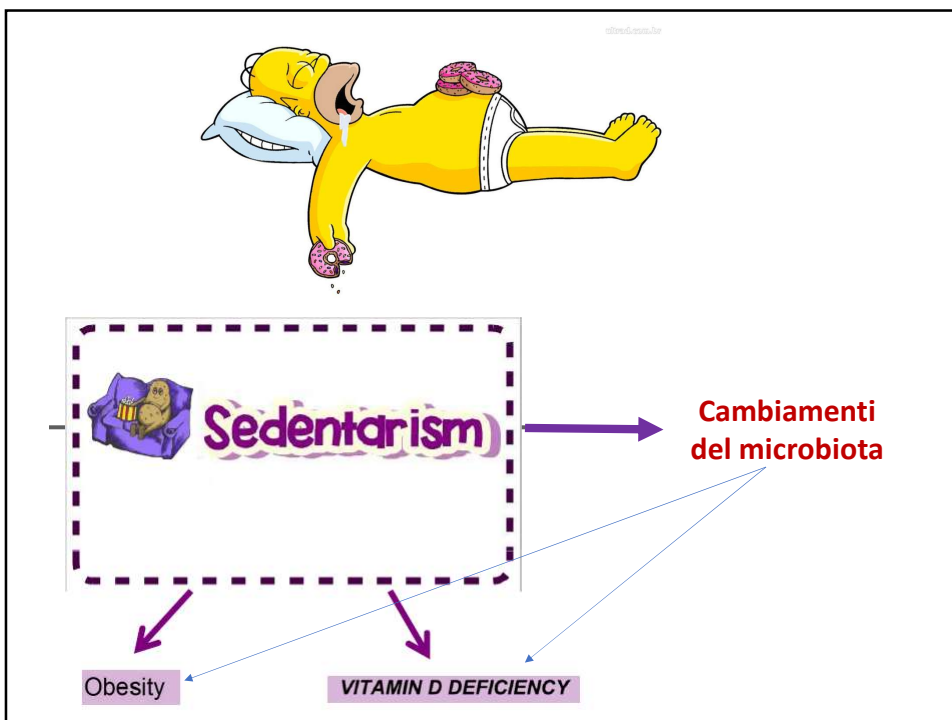
BACKGROUND: Prenatal environment has been shown to influence child's risk of atopic diseases. Laboratory-confirmed data about the role of maternal infections during pregnancy is scarce.

OBJECTIVE: The aim of this study was to determine the associations between serologically-confirmed maternal infections during pregnancy and atopic disease in the offspring.

METHODS: This was a nested case-control study within a prospective birth cohort study. Altogether 202 atopic case children and 333 matched non-atopic control children were included. Atopic outcome was defined as having an atopic disease and IgE sensitization by the age of 5 years. We analyzed serologically acute enterovirus (EV), influenza virus A (IAV) and Mycoplasma pneumoniae (M. pneumoniae) infections during pregnancy, and mother's seropositivity against human cytomegalovirus (CMV) and Helicobacter pylori.

RESULTS: Maternal EV infection during pregnancy was inversely associated with atopic outcome in the offspring (odds ratio 0.43; 95% confidence interval 0.23-0.80, $p=0.008$). Acute IAV or M. pneumoniae infections or seropositivity against CMV or Helicobacter pylori were not associated with the atopic outcome.

CONCLUSIONS AND CLINICAL RELEVANCE: Our results suggest that maternal EV infections during pregnancy are inversely associated with atopic disease in the offspring. Our finding provides further support to the previous studies suggesting an important role of the in utero environment in the development of atopic diseases. This article is protected by copyright. All rights reserved.



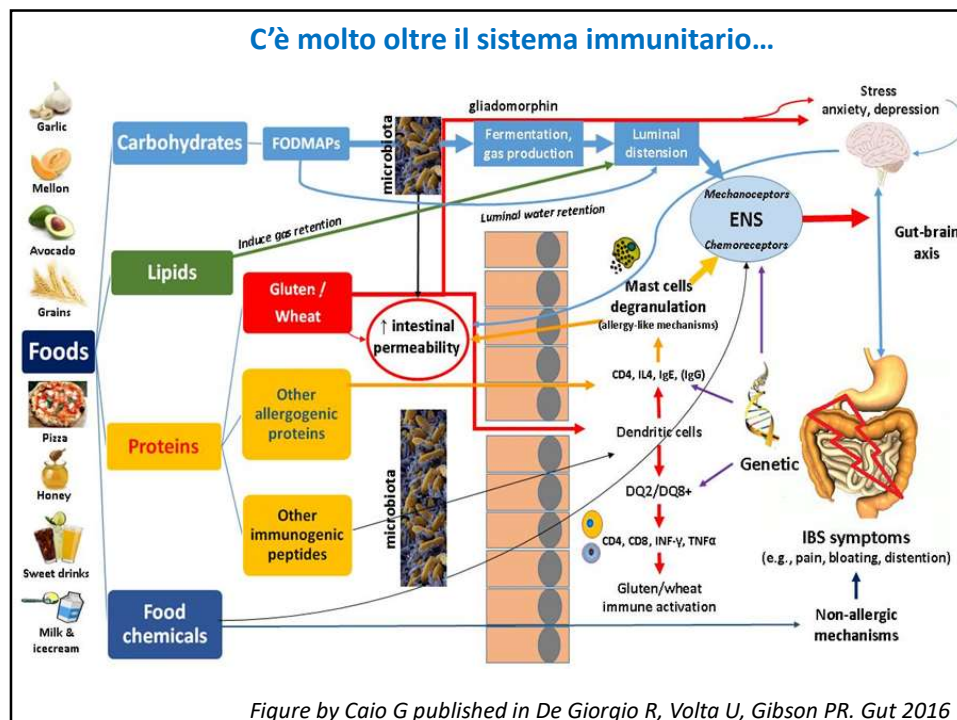
determinants of allergic diseases

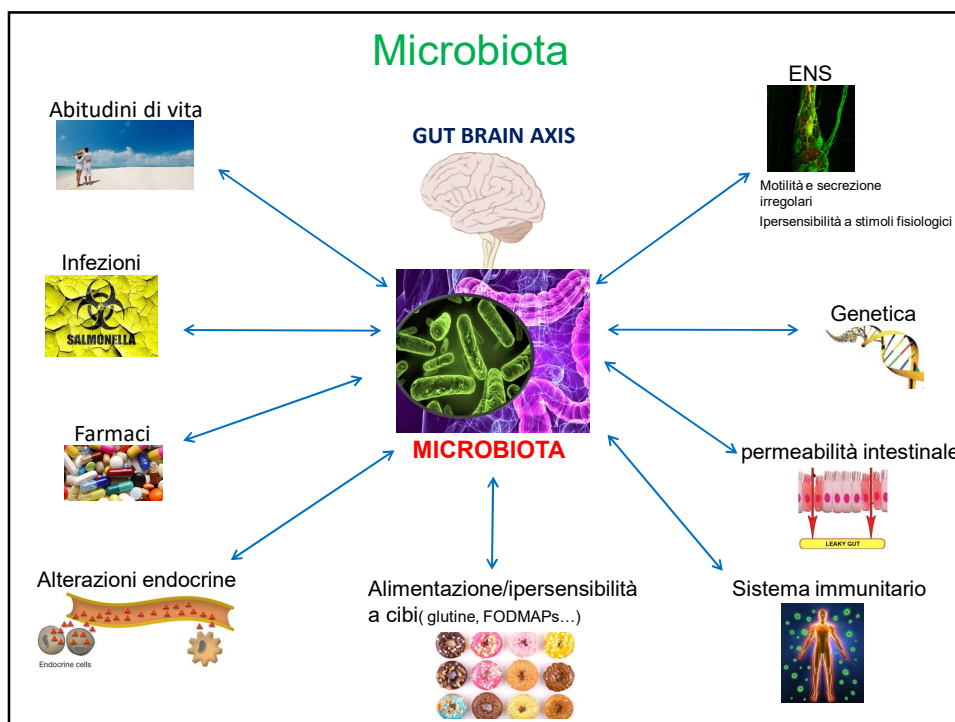


[145]. Low levels of vitamin D appear to be inversely correlated with AD severity, and vitamin D deficiency at birth is associated with higher risk of developing AD.

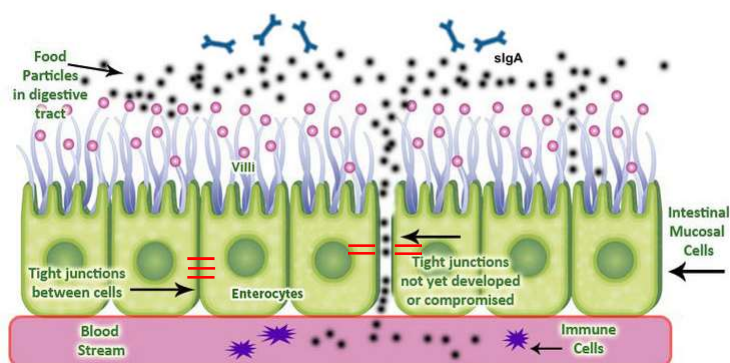
infants of Australian-born parents with vitamin D insufficiency ($25\text{OHD} \leq 50 \text{ nmol/L}$) had higher risk of peanut (OR, 11.51) and/or egg (OR, 3.79) allergy than those with adequate vitamin D levels. They were also more likely to have multiple food allergies (≥ 2) rather than a single food allergy (OR, 10.48 vs. OR, 1.82)

Clinical & Experimental Allergy, 2015 (45) 114–125.





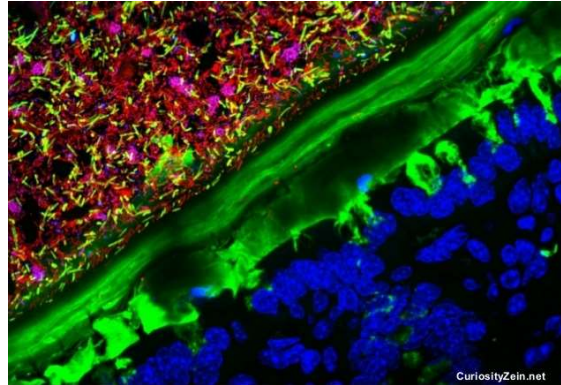
La barriera intestinale, cutanea, respiratoria: interfaccia fra il mondo e noi



Non solo cellule tight junctions....

Barriera anatomico-microbiologico-funzionale

Digestione ed assorbimento dei nutrienti



CuriosityZeln.net



Protegge dalla diffusione sistemica di macromolecole e patogeni dannosi

1. Microbiota
2. Barriera muco-epiteliale
3. Sistema immunitario
4. Rete vascolare con endotelio
5. Sistema endocrino
6. Sistema nervoso enterico
7. Enzimi digestivi

Protagonisti della reazione allergica

Allergeni

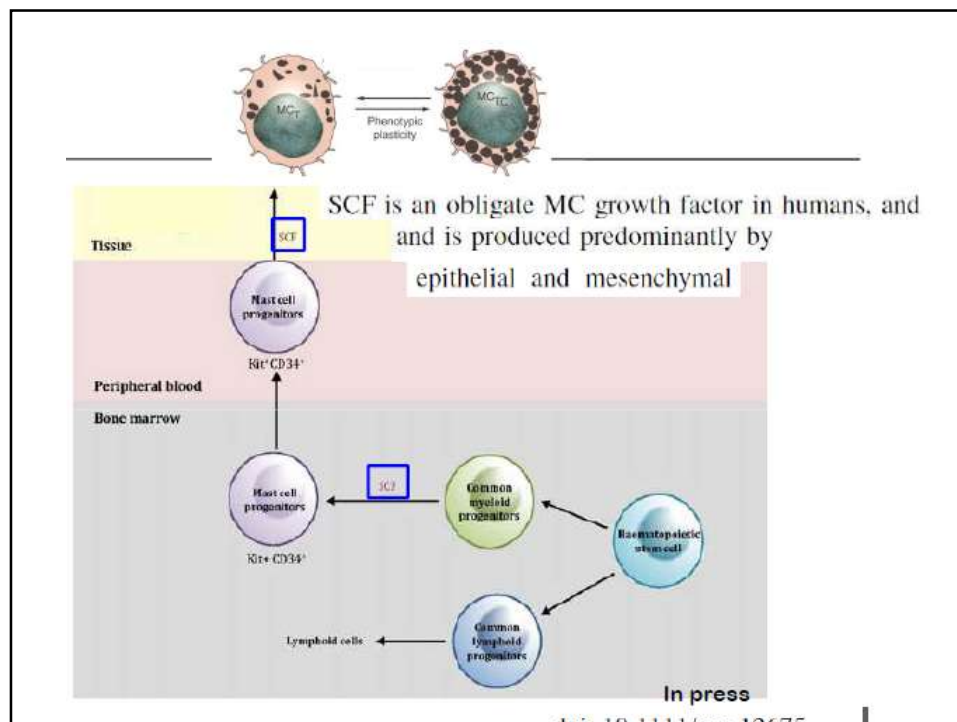
«Sistema immunitario» o
sistema di controllo mondo
interno / mondo esterno

- Allergeni: antigeni esogeni peraltro innocui
- Sistema Th2 e citochine correlate (IL-4, 5, 13)
- IgE
- Mastociti (tissutali) e basofili (circolanti) e loro mediatori: **fase immediata**
- Eosinofili e altri tipi cellulari: **fase tardiva** (ruolo nell'asma)

What Are Mast Cells?

Mast cells are leukocytes that are derived from haematopoietic progenitor cells. They circulate in the blood in an immature form before migrating to vascularised tissues, where they undergo final differentiation and maturation with the help of stem-cell factor and other cytokines secreted by endothelial cells and fibroblasts. Mast cells are found in most tissues of the body, particularly in locations that are in close contact with the external environment, such as skin, airways, and intestines. They are, therefore, ideally placed to participate in the early recognition of pathogens.

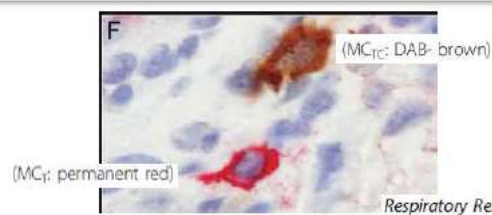
PLoS Pathogens
April 2012 | Volume 8 | Issue 4



There are two types of mast cells:

- MC_T mast cells contain only tryptase and are found predominantly in alveolar walls and the small intestinal mucosa;
- MC_{CT} mast cells containing both tryptase and chymase are present predominantly in the dermis of the skin, the intestinal submucosa and blood vessels.

Mast cell tryptase: a review of its physiology and clinical significance
Anaesthesia, 2004, 59:695-703



Respiratory Research 2011, 12:139

Skin and mucous membranes of the respiratory and GI tracts contain very high concentrations (10,000 mast cells per mm³)

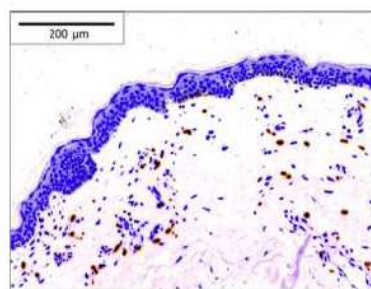


Figure 2. Mast cells in healthy skin, magnification 200x, staining of mast cells with anti-tryptase antibody (brown)

basophils



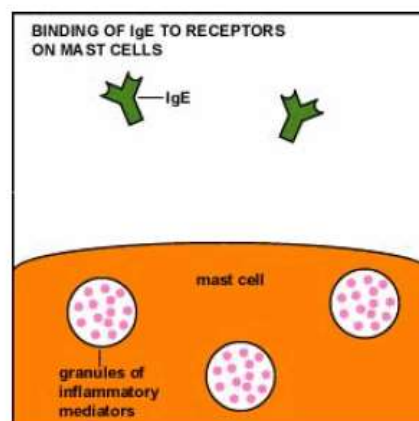
Mast cells and basophils share some functions in common and are generally associated with T helper 2 (Th2) immune responses, but taking basophils as surrogate cells for mast cell research or vice versa for several decades is problematic. Thus far, their *in vitro* functions have been well studied, but their *in vivo* functions remained poorly understood.

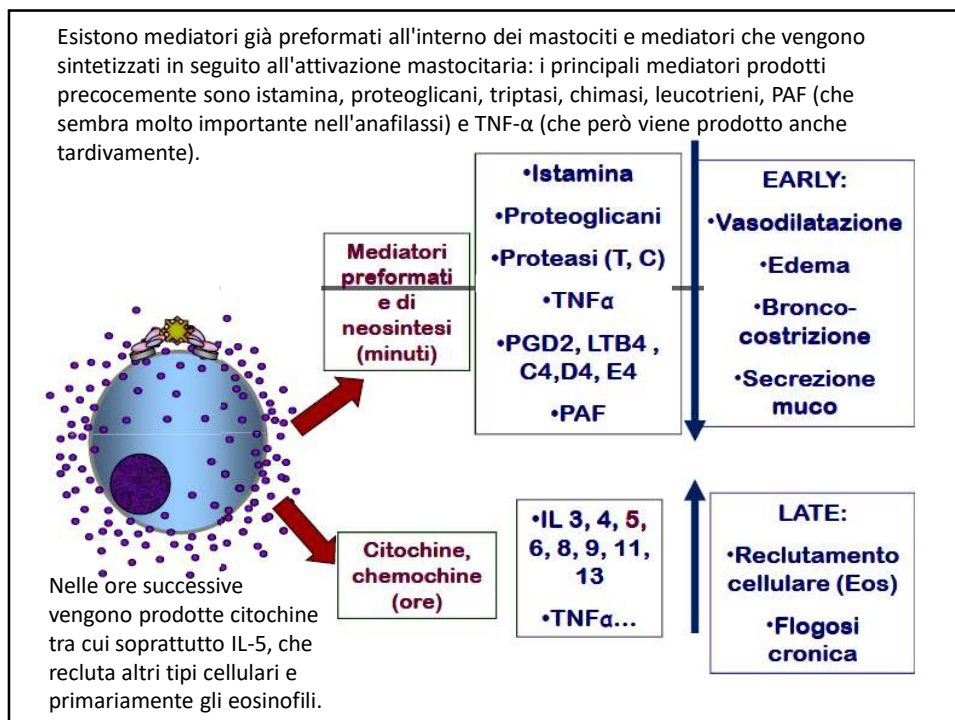
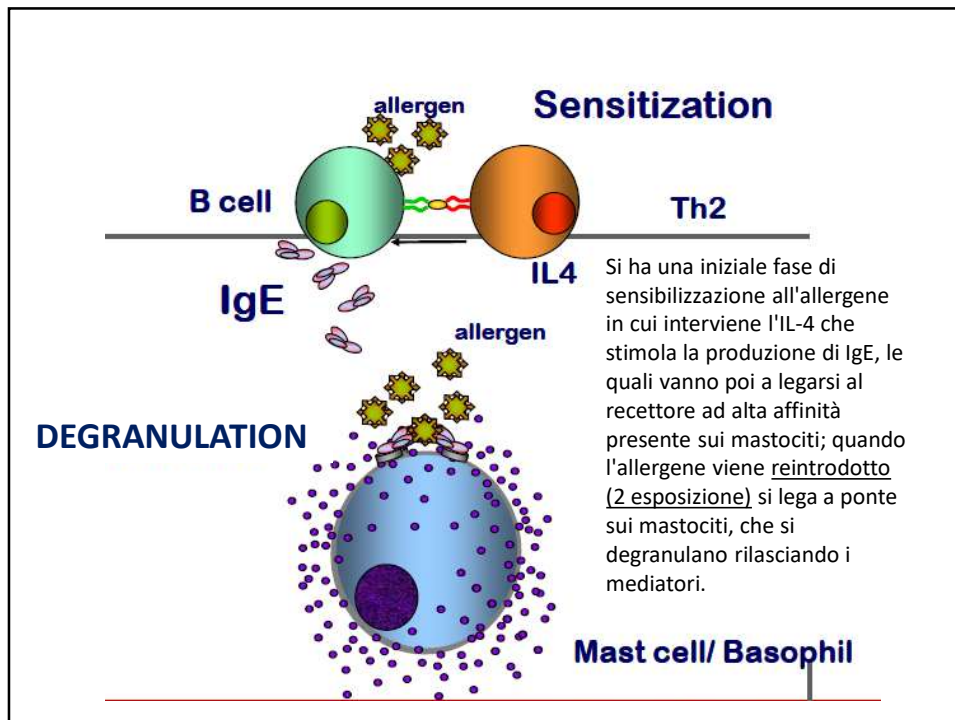
Table 1 Characterization of mast cells and basophils

	Mast cells	Basophils
Development	Bone marrow	Bone marrow
Distribution	Peripheral tissues	Blood
Survival time	Long (weeks)	Short (2–5 days)
Surface marker	FcεRIα ⁺ , CD117 (c-kit) ⁺	FcεRIα ⁺ , DX5 ⁺ , CD34 ⁺

Allergy 2015; **70**: 131–140.

Type I reaction: IgE-mediated





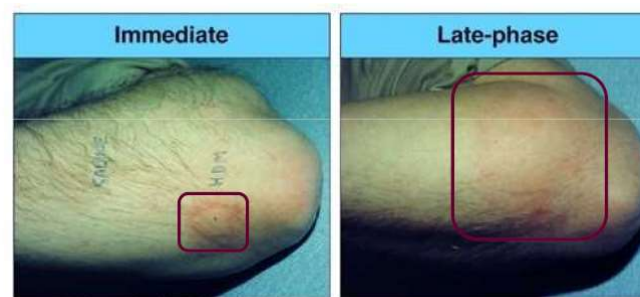
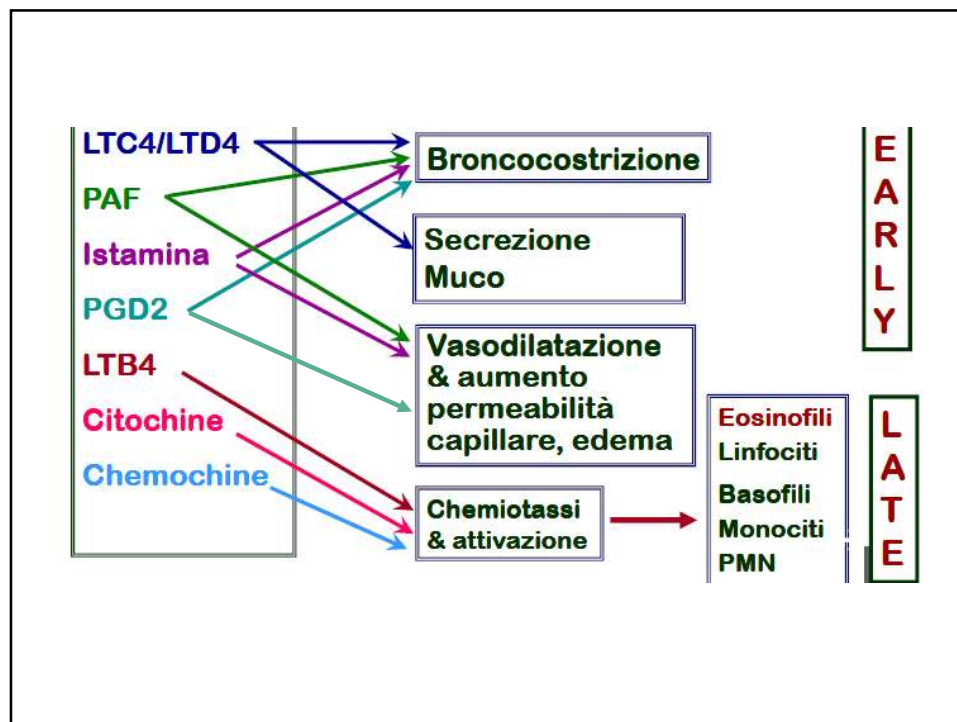


Figure 10-16 The Immune System, 2/e (© Garland Science 2005)

Questi effetti possono essere valutati tramite il prick-test, saggio cutaneo in cui gli allergeni vengono inoculati intraepidermicamente. Bisogna tener conto che in alcuni individui la fase tardiva della reazione scatenata dal test può essere più importante della fase precoce;

FEV₁ - forced expiratory volume in 1 sec after allergen challenge

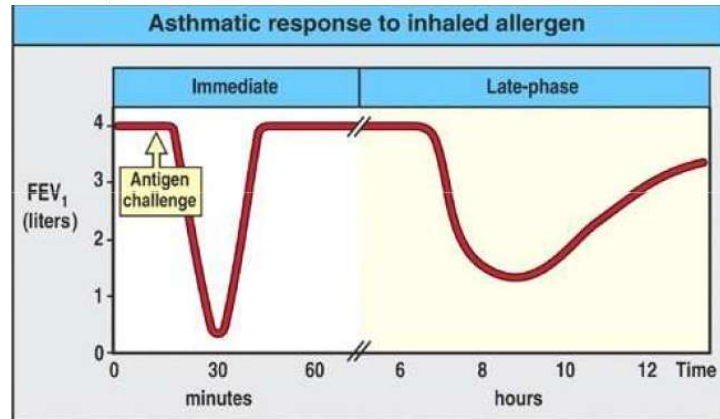
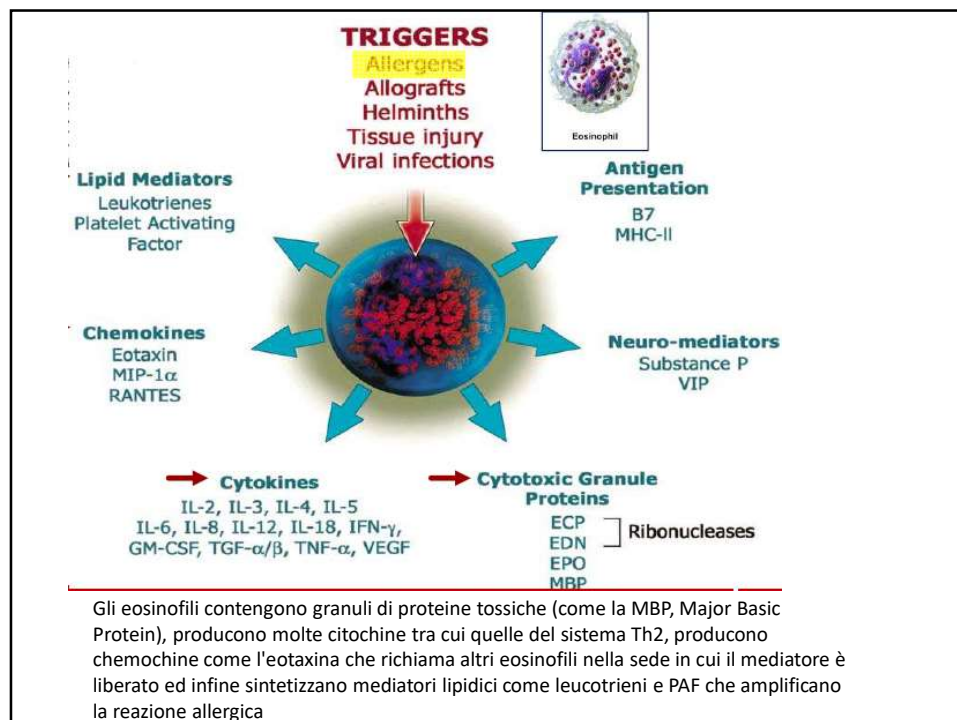
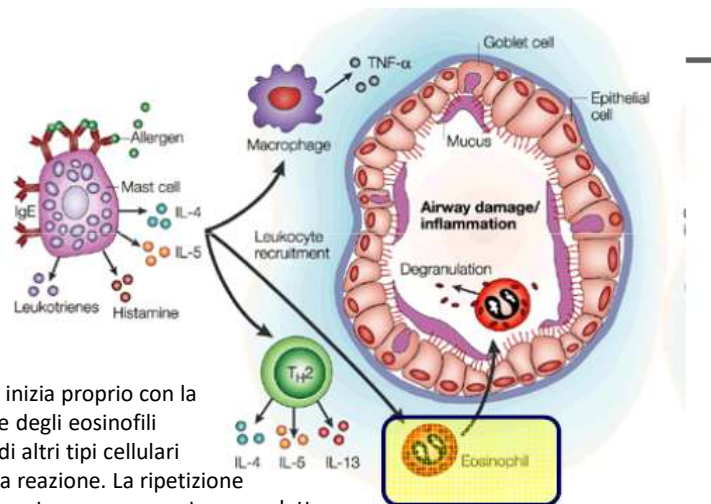


Figure 10-17 The Immune System, 2/e (© Garland Science 2005)

Questo è vero anche a livello bronchiale, con l'osservazione di una immediata riduzione di FEV₁ e una successiva risposta tardiva a distanza di ore.



Late phase



La fase tardiva inizia proprio con la degranulazione degli eosinofili ed il richiamo di altri tipi cellulari nella sede della reazione. La ripetizione successiva di questo processo porta come detto al rimodellamento asmatico dell'albero bronchiale.

Nature Reviews | Immunology

Effetti clinici dei mediatori: rinite, asma, orticaria, angioedema.....





Allergens

When Charles Blackley published his 'Researches on the causes and nature of catarrhus aestivus' in 1873 (1), he provided the first systematic investigation of an allergen source.

Immunological Reviews 2011
Vol. 242: 51–68



1. Blackley CH. Experiments and Researches on the Causes of Nature of Catarrhus Aestivas. London: Balliere, 1873.

ALLERGENI

- Allergeni inalatori
 - ❖ intermittenti
 - ❖ persistenti
- Allergeni alimentari
- (Alcuni farmaci)
- Veleno di insetti (imenotteri)

Features of inhaled allergens that may promote the priming of T_H2 cells that drive IgE responses

Protein	Only proteins induce T-cell responses
Enzymatically active	Allergens are often proteases Der p 1
Low dose	Favors activation of IL-4-producing CD4 T cells
Low molecular weight	Allergen can diffuse out of particle into mucus
Highly soluble	Allergen can be readily eluted from particle
Stable	Allergen can survive in desiccated particle

Immunological Reviews 2011
Vol. 242: 51–68

Table 1. Representative allergens from grasses, weeds, domestic animals, mites, cockroaches, and fungi

Source	Name	Airborne particles	Size in microns	Allergen(s)	Molecular weight (kilodaltons)
Rye grass	<i>Lolium perenne</i>	Pollen	30–40	Lol p 1	27
Ragweed	<i>Ambrosia artemisiifolia</i>	Pollen	20–30	Amb a 1	38
Oak tree	<i>Quercus alba</i>	Pollen	20–36	Que a 1	17
Birch tree	<i>Betula verrucosa</i>	Pollen	20–27	Bet v 1	17
				Bet v 2	15
Dust mite	<i>Dermatophagoides pteronyssinus</i>	Feces	15–30	Der p 1	24
				Der p 2	15
Cockroach	<i>Blattella germanica</i>	Debris	15–40	Bla g 1	46
				Bla g 5	23
Cat	<i>Felis domesticus</i>	Dander	2–20	Fel d 1	18
				Fel d 2	69
				Fel d 5w	400
Dog	<i>Canis familiaris</i>	Dander	2–20	Can f 1	24
				Can f 3	69
Alternaria	<i>Alternaria alternata</i>	Spores	20 × 14	Alt a 1	16
Aspergillus	<i>Aspergillus fumigatus</i>	Spores	2 × 2	Asp f 1	18
				Asp f 5	40



ACARI MAGGIORI (HOUSE DUST MITES)

Dermatophagoides pteronyssinus (DP)

Dermatophagoides farinae (DF)

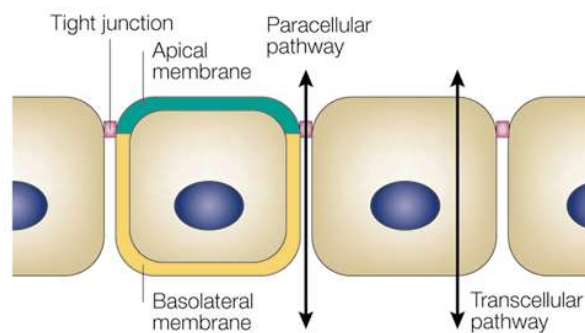


Chortoglyphus arcuatus

Lepidoglyphus destructor

Tyrophagus putrescentiae

Der p 1 facilitates transepithelial allergen delivery by disruption of tight junctions



al

Nature Reviews | Molecular Cell Biology

tier

J. Clin Invest. 104:123–133 (1999).



- * ALLERGENI CONTENUTI NEI PELLET FECALI (Der p 1-3, Der f 1-3)
- * LUNGHEZZA 0.3 mm, CIECHI, SI NUTRONO DI SCAGLIE DI PELLE UMANA ED ALTRI DETRITI (ALIMENTARI)
- * SI IDRATANO ATTRAVERSO GHIANDOLE IGROSCOPICHE E DIPENDONO TOTALMENTE DALL'UMIDITA' AMBIENTALE
- * TEMPERATURA E UMIDITA' IDEALI: 23 - 25°C (muoiono a -20°C in 24h), umidità > 60%
- * NON CRESCONO > 1600 M DI ALTITUDINE



Centro di Diagnosi, Cura e
Riabilitazione dell'Asma Infantile
1756 metri

**tasso di inquinamento ambientale minimo e
la quasi totale assenza di allergeni**

Pro & Con 3

House dust mite control is an effective treatment for asthma

Pro: Thomas Platts-Mills, United States

Con: Adnan Custovic, United Kingdom



Adnan Custovic



Thomas Platts-Mills

Blatella germanica:
"cockroach,
kissing bug"

Bla g 1, 2, 4



University of Nebraska
Department of Entomology



- Ubiquitari (cibo)
- Difficili da controllare
- USA



"Frankly, Mrs. Roach, I think you'd get more business if you changed your name."

— Zalm



**Nel bambino suscettibile
l'esposizione precoce agli
allergeni degli scarafaggi può
contribuire significativamente
allo sviluppo di ASMA**

EPITELI ANIMALI



Possibili cross-reazioni tra epiteli di animali diversi



Cat dander

The importance of cat allergens to rhinitis and asthma has been obvious for over 100 years. However, the data on cat allergens is not nearly as straightforward as that for pollen or dust mites. In houses with a cat, the quantity of cat allergen inhaled per day can approach estimates of pollen allergens inhaled per year. Despite this high exposure, in countries with 'high' exposure to pollen, mite, and cat allergens, the prevalence of sensitization to cats is lower than that for mite or grass pollen (49, 57). Thus, we could consider that cat allergens are less successful or less immunogenic than other allergens. On the other hand, in most studies, the presence of IgE antibodies to cat or positive skin tests is strongly associated with asthma.

*Immunological Reviews 2011
Vol. 242: 51–68*

The protein that is the major allergen of cats, Fel d 1, is highly conserved throughout the cat family but has little or no homology with other mammalian proteins. This of course may be the reason why it is such an important or dominant allergen. In many studies, the quantitative correlation between

*Immunological Reviews 2011
Vol. 242: 51–68*

A house with a cat accumulates large quantities of cat allergen in carpets, furniture, etc., as well as on the cat itself. This allergen is easily measurable both in dust samples and airborne (22–24). However, it is also possible to detect cat allergen in homes without a cat, particularly if there is direct movement from houses with a cat to the house without a cat. In addition, cat allergen can be detected in schools and other public places. Thus, it is not surprising that children raised in houses without a cat may become allergic. In 1999, Hesselmar

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Tristan da Cunha, asma e gatti



Tristan da Cunha, asma e gatti (allontanati nel 1974)



Sensitization to cat without direct exposure to cats

Clinical and Experimental Allergy, 1999, Volume 29, pages 762–765

Results Positive skin test reaction to cat was present in 57 (20.1%) of all islanders and in six (12.8%) of those born in or after 1975, 1 year after cats had been exterminated. Five of these six residents were born within 5 years of extermination of cats; two of these had attended school outside the island. A low level of cat allergen (Fel d 1) was found in only one out of 20 homes even though house dust mite allergens (Der p 1 or Der f 1) were found in all homes.

Conclusion Sensitization to cat allergen occurs on the island of Tristan da Cunha where there is no direct exposure to cats. This is due either to the persistence of the allergen after the removal of the animal or to the allergen being brought in on visitors' clothing.

Esposizione precoce previene la sensibilizzazione?



TO KILL THE CAT OR BUY ANOTHER ONE ?



Adnan Custovic



Thomas Platts-Mills

**Lavare il gatto almeno 1
volta/settimana**



CAVALLO



Horse allergens: An underestimated risk for allergic sensitization in an urban atopic population without occupational exposure

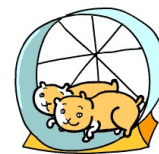
Methods: From among 1822 consecutive outpatients, we selected all subjects who had an immediate skin reaction to horse dander. We recorded the patients' clinical history including a meticulous evaluation of the possibility and eventual modality of horse exposure, and the results of skin-prick tests (SPT) and total/specific IgE antibody analyses.

Results: Of 1201 SPT-positive patients, 35 (3.43%) were sensitized to horse dander. No patient was mono-sensitized. Six individuals reported having direct horse contact, 10 subjects had occasional contact with horse owners (indirect exposure), and 19 denied direct or indirect exposure to horses or horse allergens. Twenty of the 35 horse-sensitized patients reported both nasal and bronchial symptoms, 14 had rhinitis without asthma and one had asthma without rhinitis.



Respiratory Medicine (2009) 103, 414–420

ALTRI EPITELI ANIMALI PIU' RARAMENTE COINVOLTI

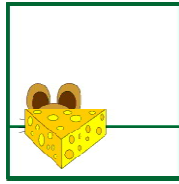


• **Animali da laboratorio (allergia professionale) o infestanti: ratti, topi, cavie, conigli**



• **“Nuovi” animali domestici: criceti, conigli nani...**





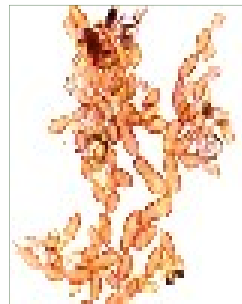
- Allergeni del topo (Mus m 1) presenti nella maggior parte delle case di NY e Baltimora
- La sensibilizzazione al topo avviene a livelli molto bassi di esposizione

Muffe indoor & outdoor: concentrazione spore > pollini

Alternaria



Cladosporium



- ◆ Sensibilizzazione poco frequente in Italia
- ◆ Fascia di età < 18 aa
- ◆ Associate ad asma



Latex is the name for the milky sap collected from the rubber tree- *hevea brasiliensis*



GLOVES



- **Guanti con talco** - le proteine del NRL si legano alla polvere del talco
- Cambiando guanti le proteine si disperdono nell'ambiente e vengono a contatto con le mucose
- In calo dopo "l'epidemia degli anni '90"

Allergia respiratoria e da contatto FINO ALL'ANAFILASSI LETALE

For asthmatics with a latex allergy, contact with latex can cause both contact dermatitis reaction and an asthma attack.





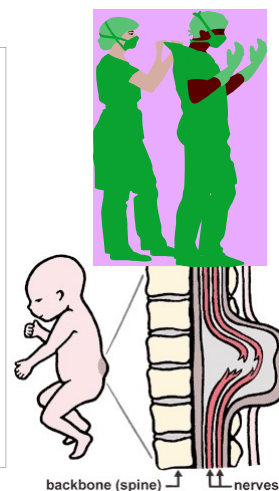
• Since 1989, FDA has received reports of 15 deaths and numerous other severe allergic reactions associated with exposure to NRL enema cuffs

• These deaths were associated with anaphylactic reactions to the NRL cuff on the tip of barium enema catheters

who is at risk?

→ health care workers: 4.5-14.4% sensitivity

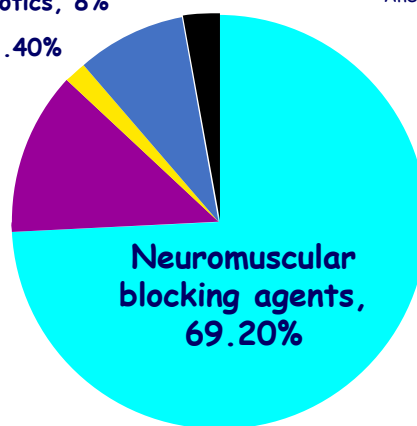
→ children with spina bifida and genitourinary abnormalities: 34-100% sensitivity



**Patients with spina bifida –
regardless of a history of NRL
allergy should have all medical-
surgical-dental procedures performed
in a latex-safe environment**

Colloids, 2.70%
Antibiotics, 8%
Opioids, 1.40%

**NRL
12.1%**



Mertes P, Laxenaire M. Allergic reactions occurring during anaesthesia. *European Journal of Anaesthesiology* 2002; 19:240-262

Agents involved (%) in anaphylaxis during anaesthesia in France (n=477) from January 1997 to December 1998

Oggetti contenenti NRL CHE CAUSANO REAZIONI

Frequentemente

- Guanti
- Sonde
- Palloncini
- Condom e diaframmi

Raramente

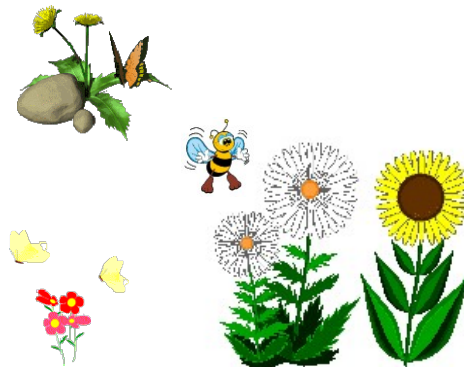
- Lacci emostatici, gomme da matita, tettarelle, materassi, parti di giocattoli, attrezzatura da sub, materiale per scarpe...

POLLINI



Entomofila

Piccole quantità di polline trasportate dagli insetti



Anemofila

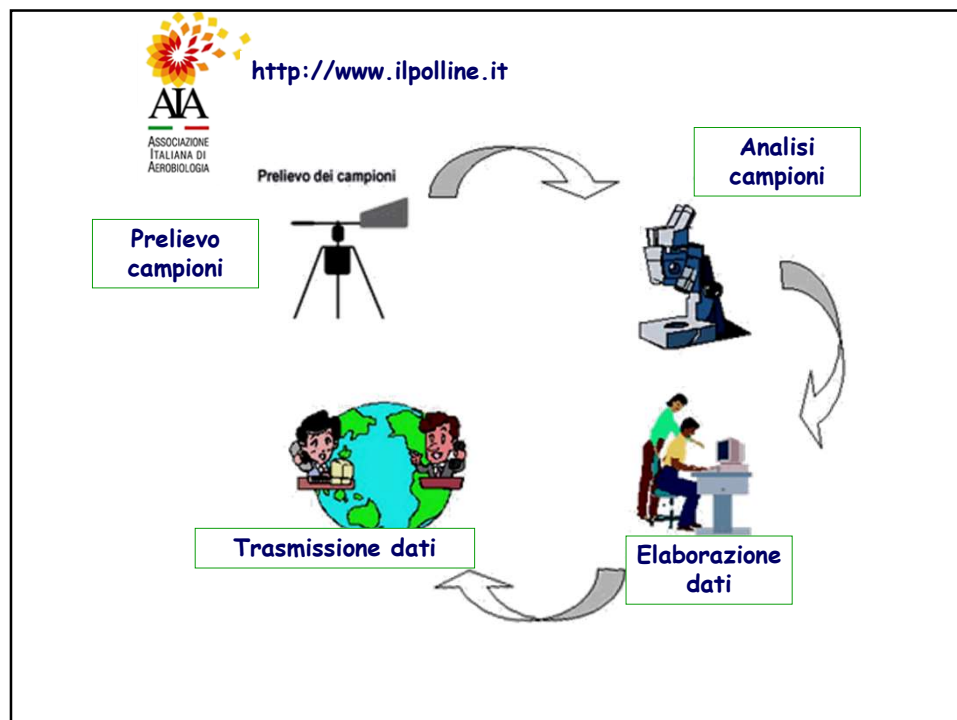
Grandi quantità di polline diffuse dal vento





•I granuli pollinici di queste piante hanno spesso piccole dimensioni (**10-200 μ**), possono rimanere a lungo **sospesi** nell'aria e venire facilmente inalati

•Le dimensioni hanno una notevole influenza sulle **localizzazioni** dei granuli nei diversi tratti dell'apparato respiratorio



I pollini di maggior interesse dal punto di vista allergologico

- | | | |
|---|---|--|
| Alberi

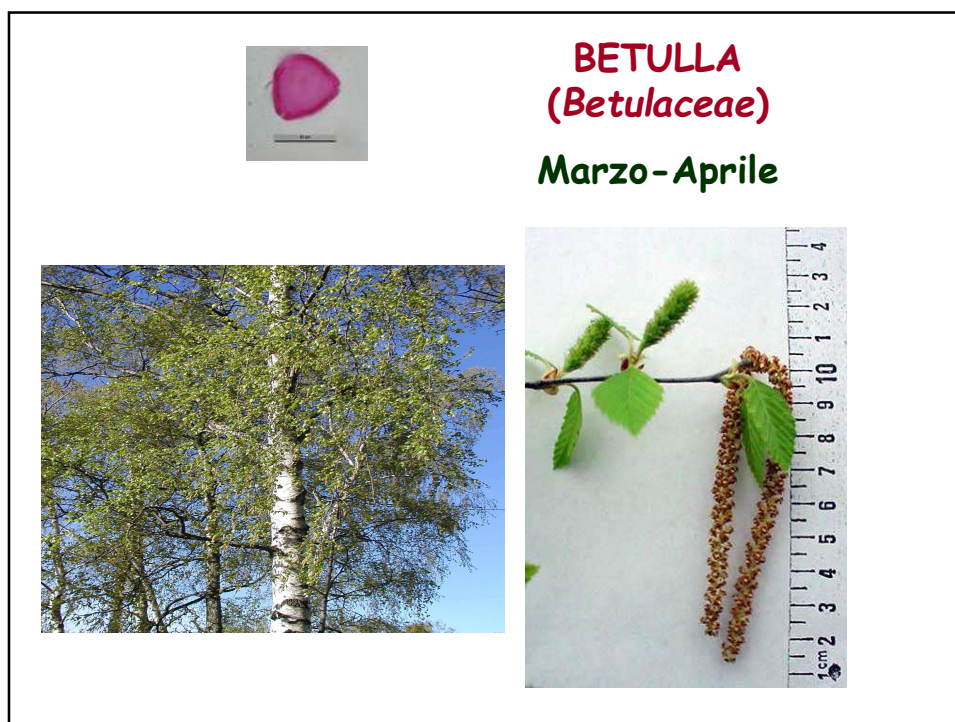
Piant
erbase | { | → Nocciolo (Corylaceae) |
| | | → Ontano e Betulla (Betulaceae) |
| | | → Cipresso (Cupressaceae) |
| | | → Olivo (Oleaceae) |
| | | → Graminaceae |
| | | → Parietaria (Urticaceae) |
| | | → Plantago lanceolata (Plantaginaceae) |
| | | → Ambrosia e Artemisia (Compositae) |



CIPRESSO
(Cupressaceae)

Dicembre - Febbraio





ULIVO (Oleaceae)

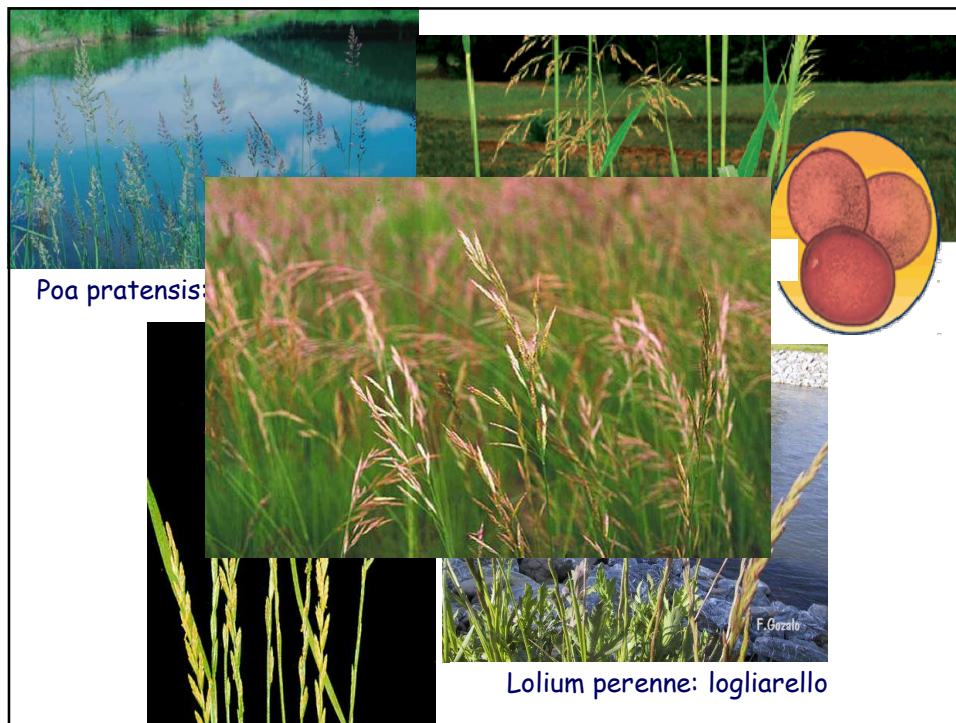
Marzo - Maggio

GRAMINACEAE

Aprile - Giugno

> 20 varietà

Erba canina





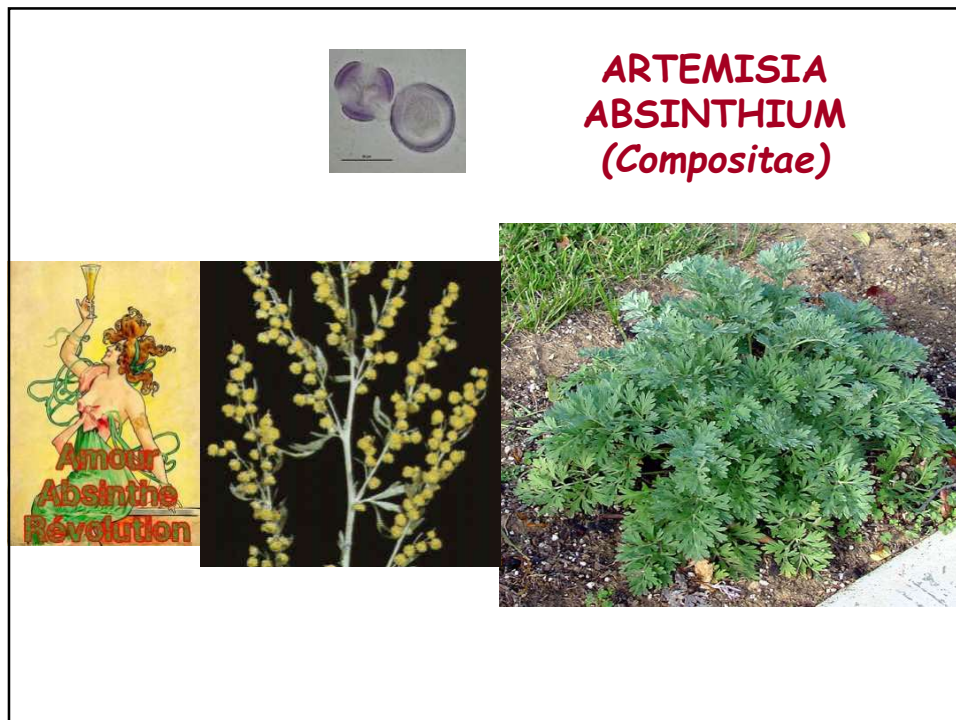
**PLANTAGO
LANCEOLATA**
(*Plantaginaceae*)



ARTEMISIA VULGARIS
(*Compositae*)

Agosto-Settembre







*Originaria del Nordamerica (**ragweed**), dove sarebbe responsabile del **40%** dei casi di pollinosi

*È presente in Europa centrale, in Francia, in Nord Italia (soprattutto province di Varese, Milano, Pavia, Torino e Trieste)

*Altamente infestante



Il decreto Regione Lombardia n.25522 del 29.3.99

ORDINA

art. 1 - Ai proprietari e/o conduttori di aree agricole non coltivate; ai proprietari di aree verdi urbane incolte e di aree verdi industriali dismesse; ai responsabili dei cantieri edili aperti da almeno un anno alla data di entrata in vigore della presente ordinanza; ai responsabili dell'ANAS-S.p.A., della FNME, ciascuno per le rispettive competenze, di **vigilare, a partire dal mese di maggio**, sull'eventuale presenza di "**Ambrosia**" nelle aree di loro pertinenza ed eseguire tra **giugno ed i primi venti giorni di agosto**, periodici interventi di manutenzione e pulizia (aree verdi, aree dismesse, cigli stradali e autostradali, **massicciate ferroviarie**) che prevedano quantomeno **tre sfalci**