

“Allergen Avoidance: Strategies: How effectively can it be utilized ?”



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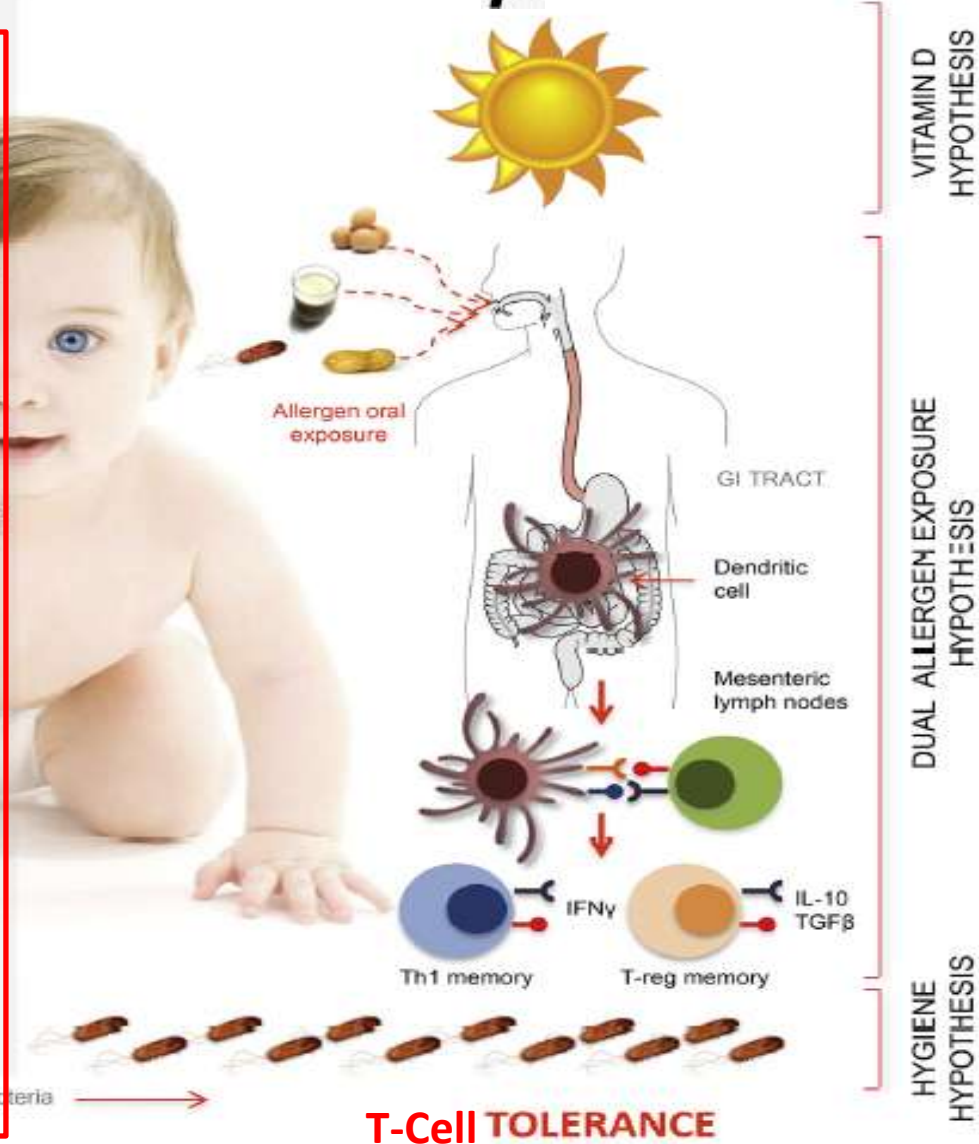
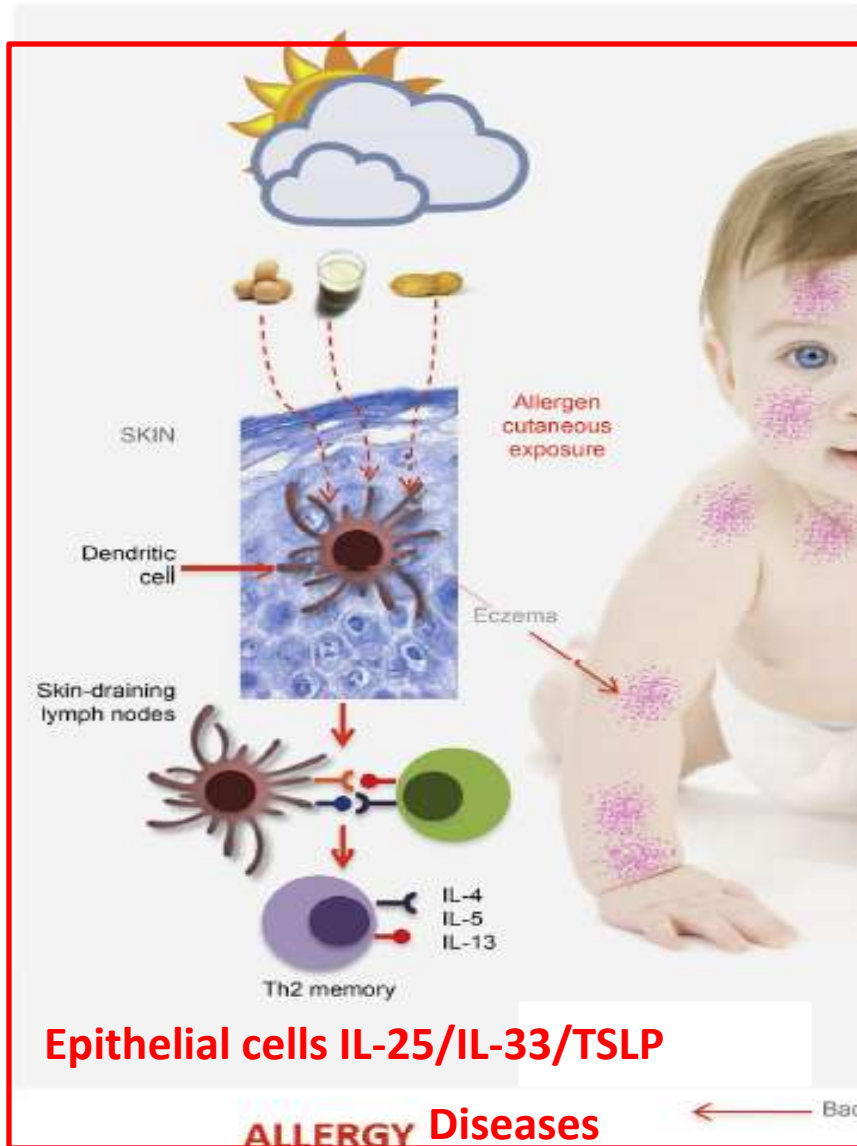
“NATIONAL ALLERGY CENTRE”

“BLK Super specialty Hospital, Delhi”

Development of Allergy vs Tolerance

TH2-IL-4/IL-5/IL-13-(IgE)

IL-10/TGF- β (IgG-4)



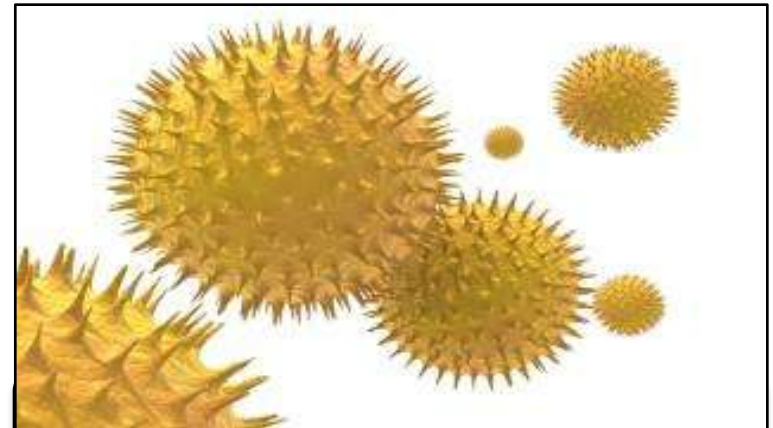
Respiratory Allergens

Aero-allergens Are The Most Common

- Triggers include:



Dust Mites



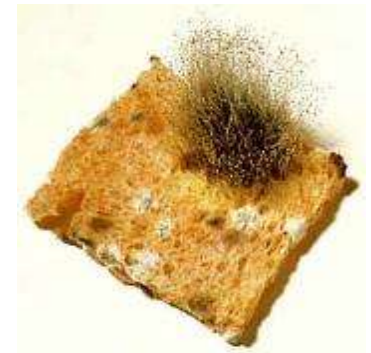
Pollen



Cockroach

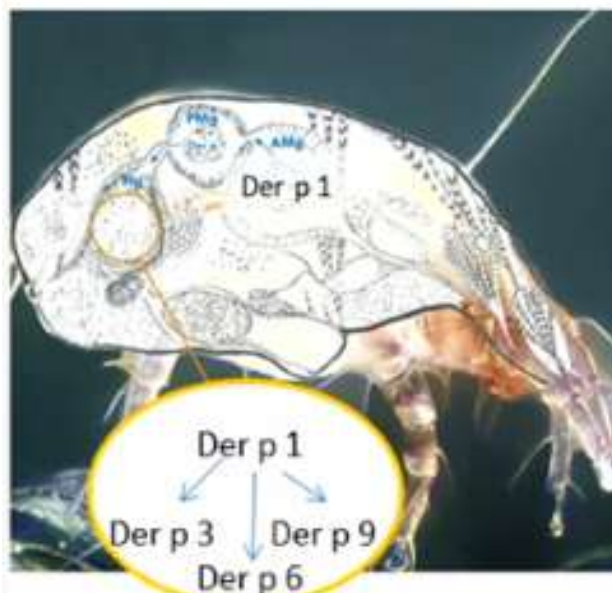


Animal Dander

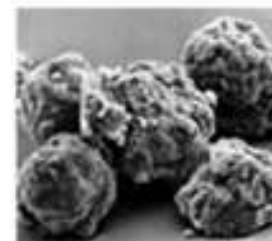


Mold

Most *Der p* allergens have enzymatic activity

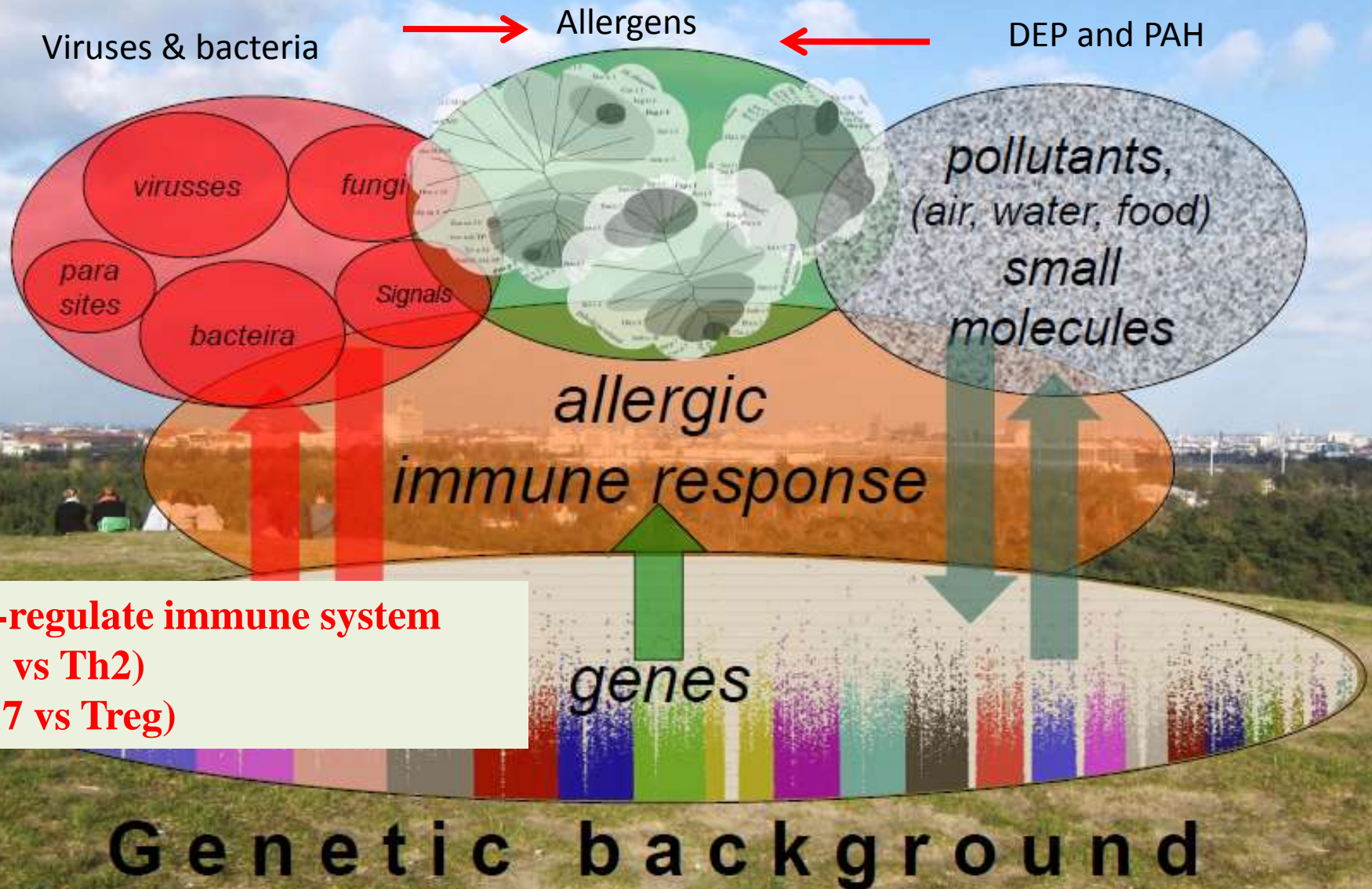


Der p 1	Cysteine protease (papain-like)
Der p 2	MD-2 related lipid recognition domain
Der p 3	Trypsin (serine protease)
Der p 4	Alpha amylase
Der p 5	alpha-helical protein of unknown function found exclusively in mites moderately cross reactive with Der p 21
Der p 6	Chymotrypsin (serine protease)
Der p 7	Binds lipopeptide polymyxin B Structurally homologous to lipid binding proteins
Der p 8	Glutathione S-transferase
Der p 9	Collagenolytic serine protease
Der p 10	Tropomyosin
Der p 11	Paramyosin
Der p 12	Chitinase (lacks a catalytic domain)
Der p 13	Lipocalin Lipid transporter
Der p 14	Apolipoprotein High molecular weight allergen found in lipid bodies and transport particles
Der p 15	Chitinase
Der p 18	Chitinase
Der p 20	Arginine kinase
Der p 21	alpha-helical protein of unknown function found exclusively in mites moderately cross reactive with Der p 5
Der p 23	Unknown function, homology to peritrophin-A domain (PF01607)



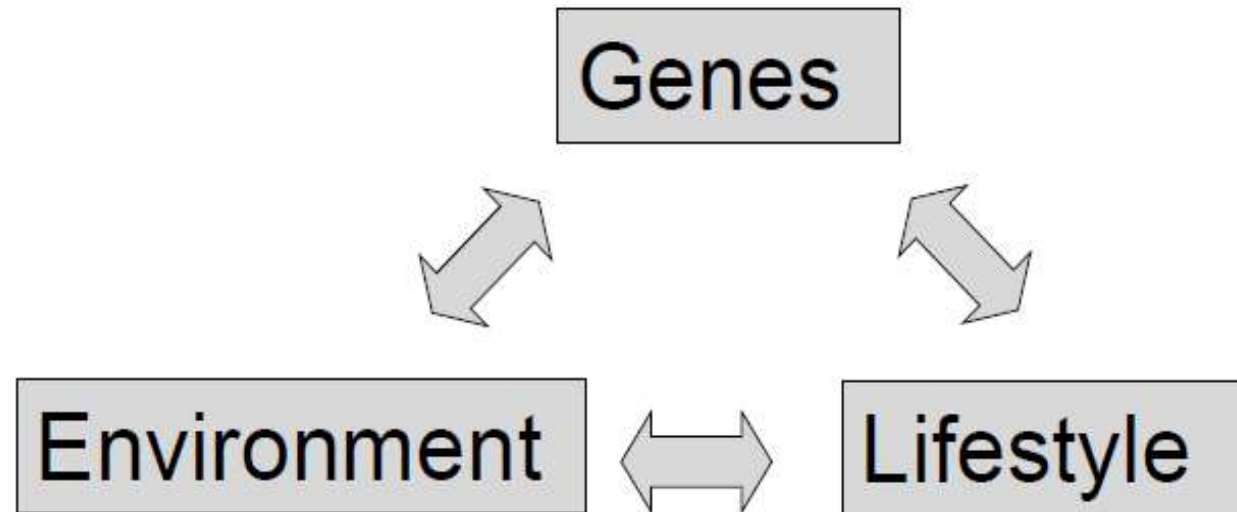
10 μm
20-40 particles a day
0.1 to 10 ng Der p 1 per particles

Environmental exposure



Why is there an Increase in Allergic Diseases?

Risk factors for allergy



- Hygiene hypothesis
- Air pollution
- Allergen exposure
- Indoor climate



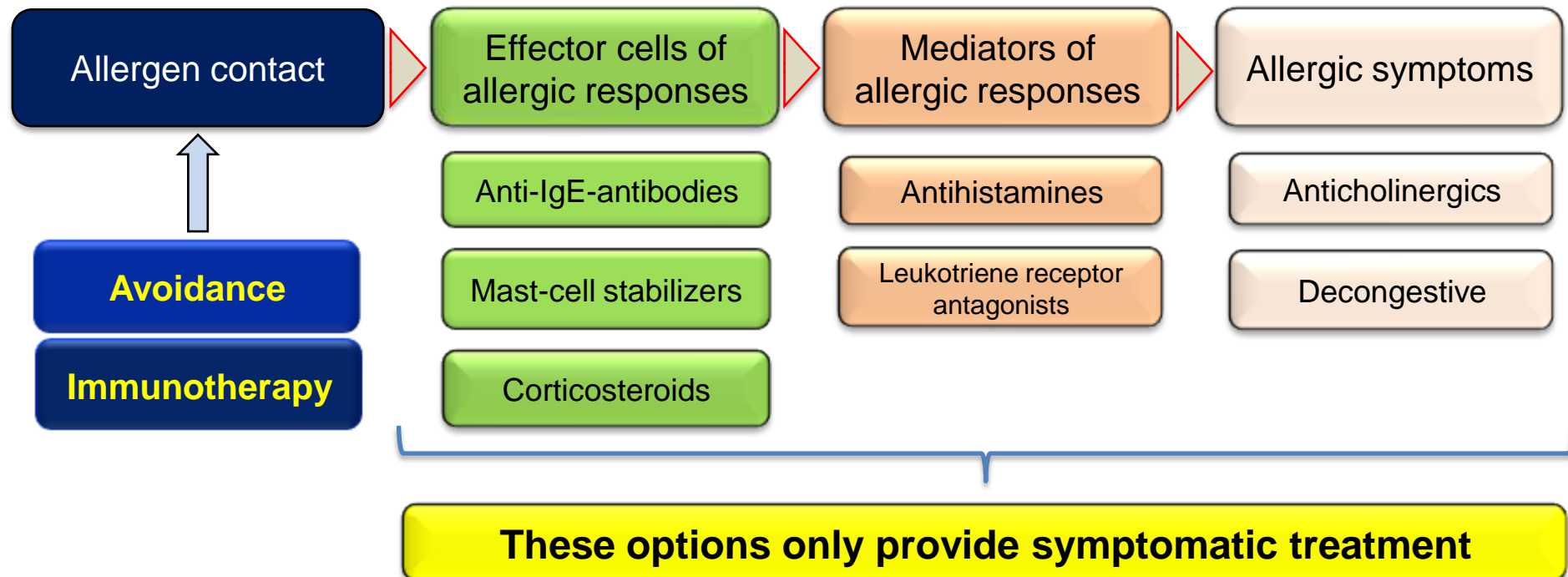
- Diet (e.g. antioxidants)
- Vitamin D (decreased sunlight)
- Obesity and overweight
- Physical inactivity
- Alcohol



Influence of Anti-Allergic Drugs



At present, allergen avoidance and immunotherapy are the only treatments that modify the course of an allergic disease either by preventing the development of new sensitivities or by altering the natural history of disease or disease progression.



Treatment of Allergic Diseases



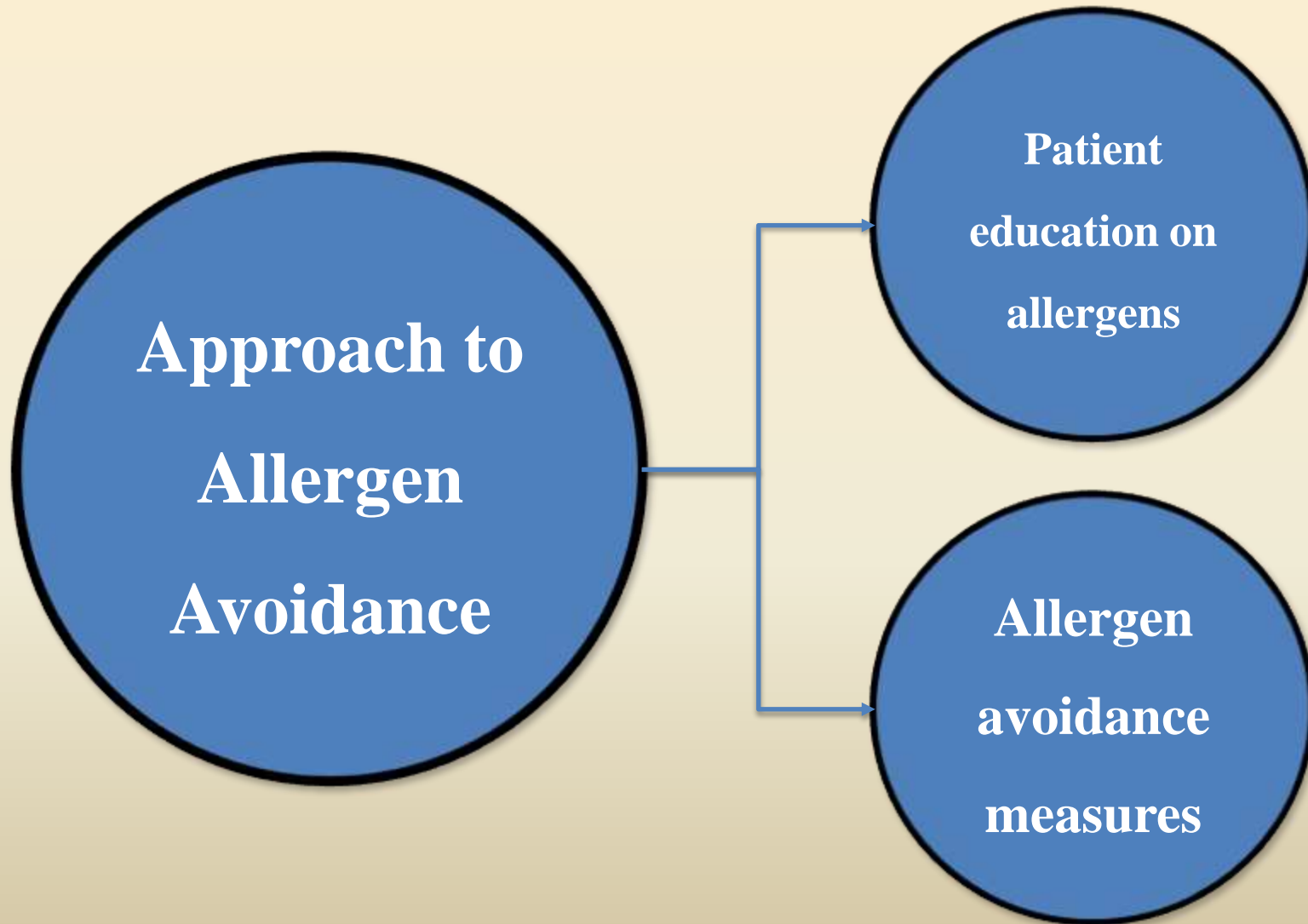
Patient education
(Always indicated)

Pharmacotherapy
(Effective, and easily administered)

Allergen avoidance
(Indicated when possible)

Immunotherapy
(Effective, alters the natural course of the disease)

Approach to Allergen Avoidance



Allergen Avoidance: Guideline Recommendations

Guidelines for Prevention of Allergy and Allergic Asthma



Primary prevention

- Reduce exposure to inhalant allergens in young children at high risk (dust mites, cockroaches, furred pets) (B).

- **Secondary prevention**

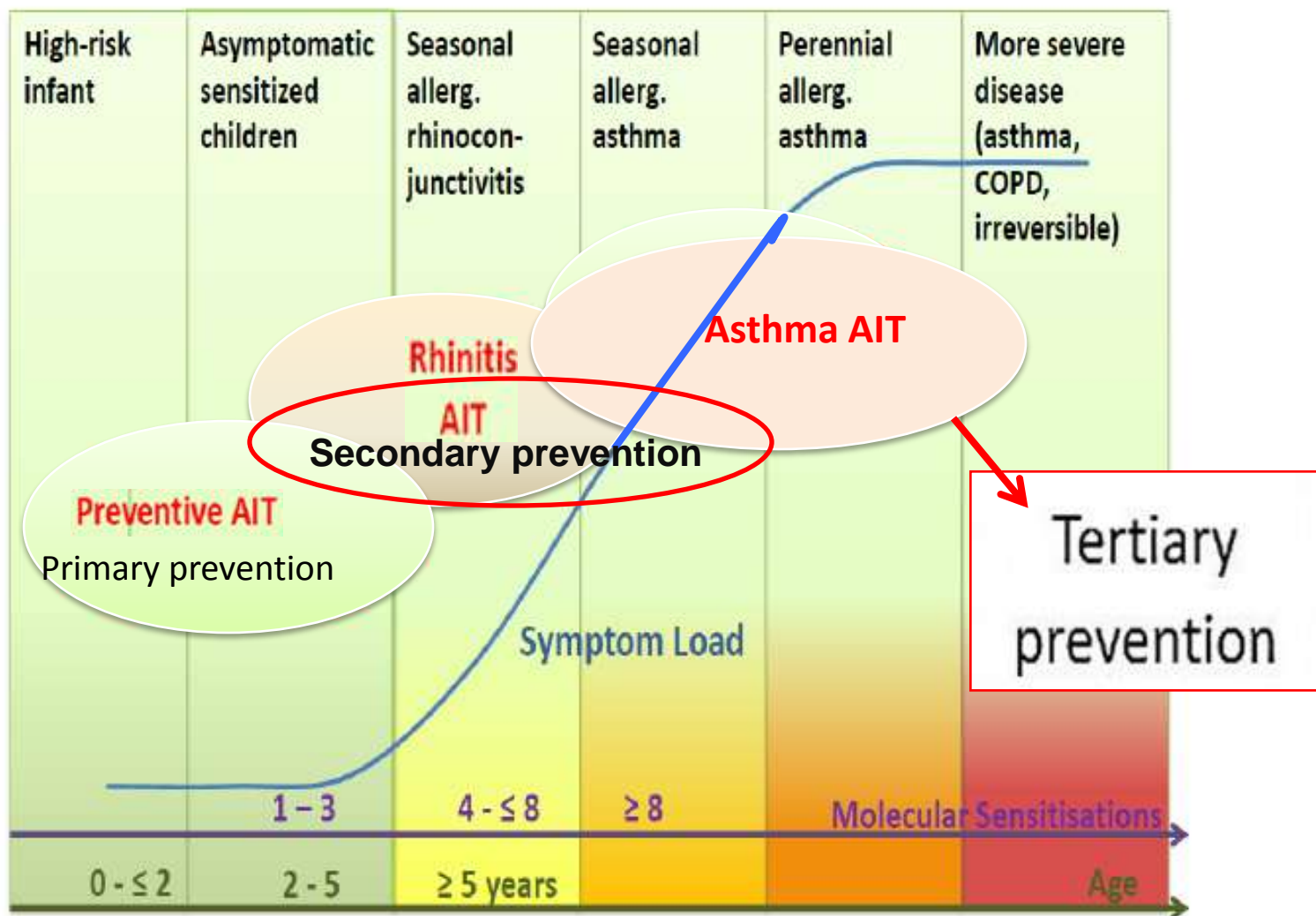
- In young children already sensitized to house dust mites, pets or cockroaches, exposure should be reduced to prevent onset of allergic disease (B).

- **Tertiary prevention**

Patients with asthma, rhinoconjunctivitis or eczema, who are allergic to indoor allergens such as dust mites, cockroaches and animal danders, should eliminate or reduce the exposure to improve symptom control and prevent exacerbations (A–B).

Allergy Prevention by AIT & Allergen Avoidance

Age-Dependent Windows of Opportunity





CME Review

Environmental control measures for the management of atopy

Meredith A. Dilley, MD ^{*,†}; Wanda Phipatanakul, MD, MS ^{*,†}



^{*} Boston Children's Hospital, Boston, Massachusetts

[†] Harvard Medical School, Boston, Massachusetts

The goal of environmental intervention measures in the patient with atopy should be aimed at decreasing symptoms and improving quality of life

In the sensitized individual, a multifaceted approach to decreasing exposure and abatement of the allergen reservoir can improve overall symptom control and quality of life

Clinical Practice Guideline: Allergic Rhinitis



- Clinicians may advise avoidance of known allergens in AR patients who have identified allergens that correlate with clinical symptoms.

Evidence quality: Grade B



Indoor Environmental Control Practices and Asthma Management

- Indoor environmental exposures, **particularly allergens and pollutants**, are major contributors to asthma morbidity in children; environmental control practices aimed at reducing these exposures are an **integral component of asthma management**



- **Allergen Avoidance: Guideline Recommendations**

Allergen immunotherapy: A practice parameter third update

Chief Editors: Linda Cox, MD, Harold Nelson, MD, and Richard Lockey, MD

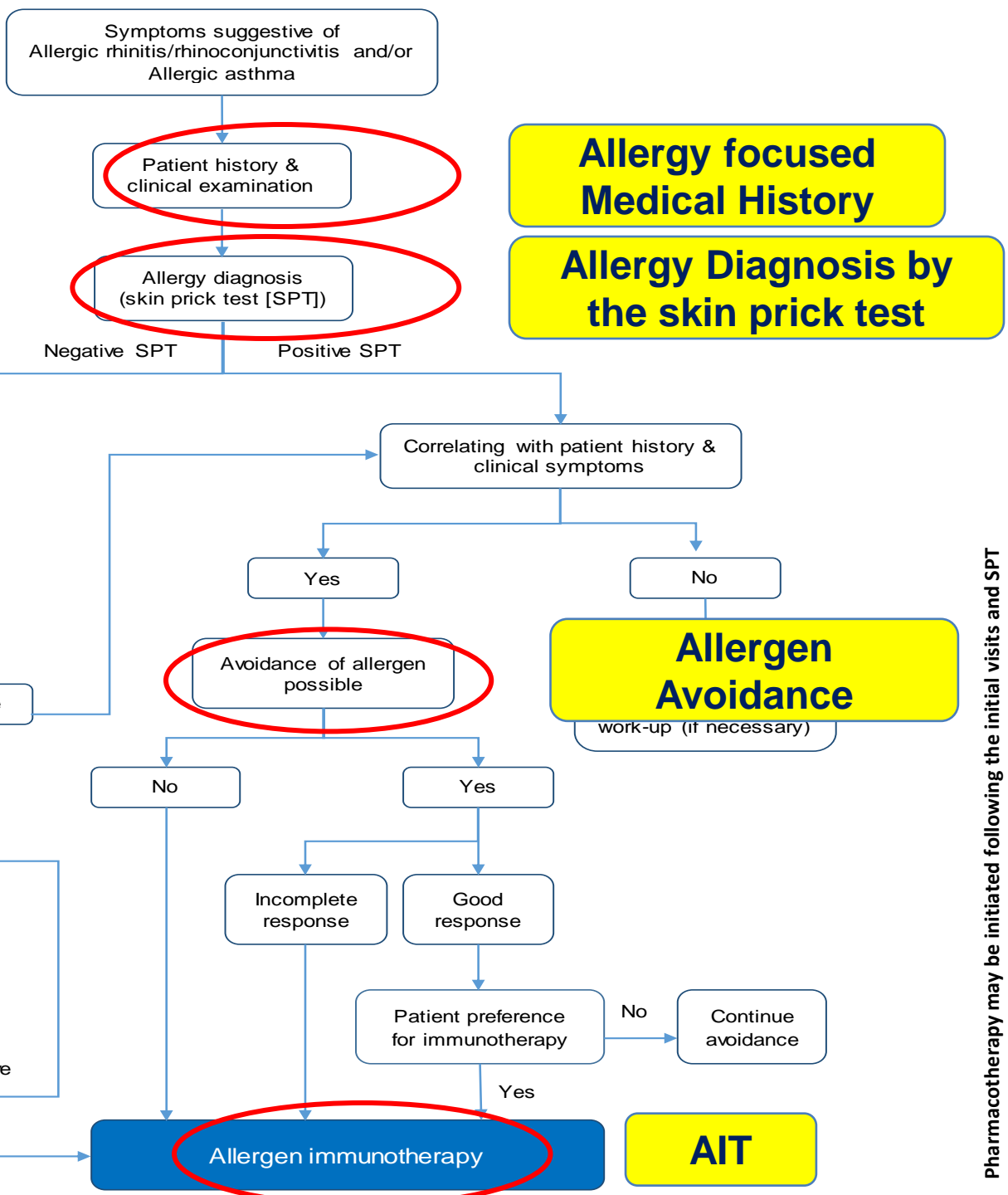
AIT should be considered along with pharmacotherapy and allergen avoidance in the management of children with allergic rhinitis / rhino-conjunctivitis, allergic asthma, and stinging insect hypersensitivity.

AIT for HDM is effective and should be considered in conjunction with avoidance measures in patients who have symptoms consistent with HDM allergy and specific IgE antibodies for HDM allergens.

At present, the only treatment for food hypersensitivity is avoidance

Algorithm for Allergy Management

Indian AIT Guidelines 2017



- When you do a “test” for “allergies,” you are only measuring one of the two essential items that determine an allergic reaction:

Allergic Reaction = Allergic Sensitivity x Allergic Load

ALLERGY
Our testing



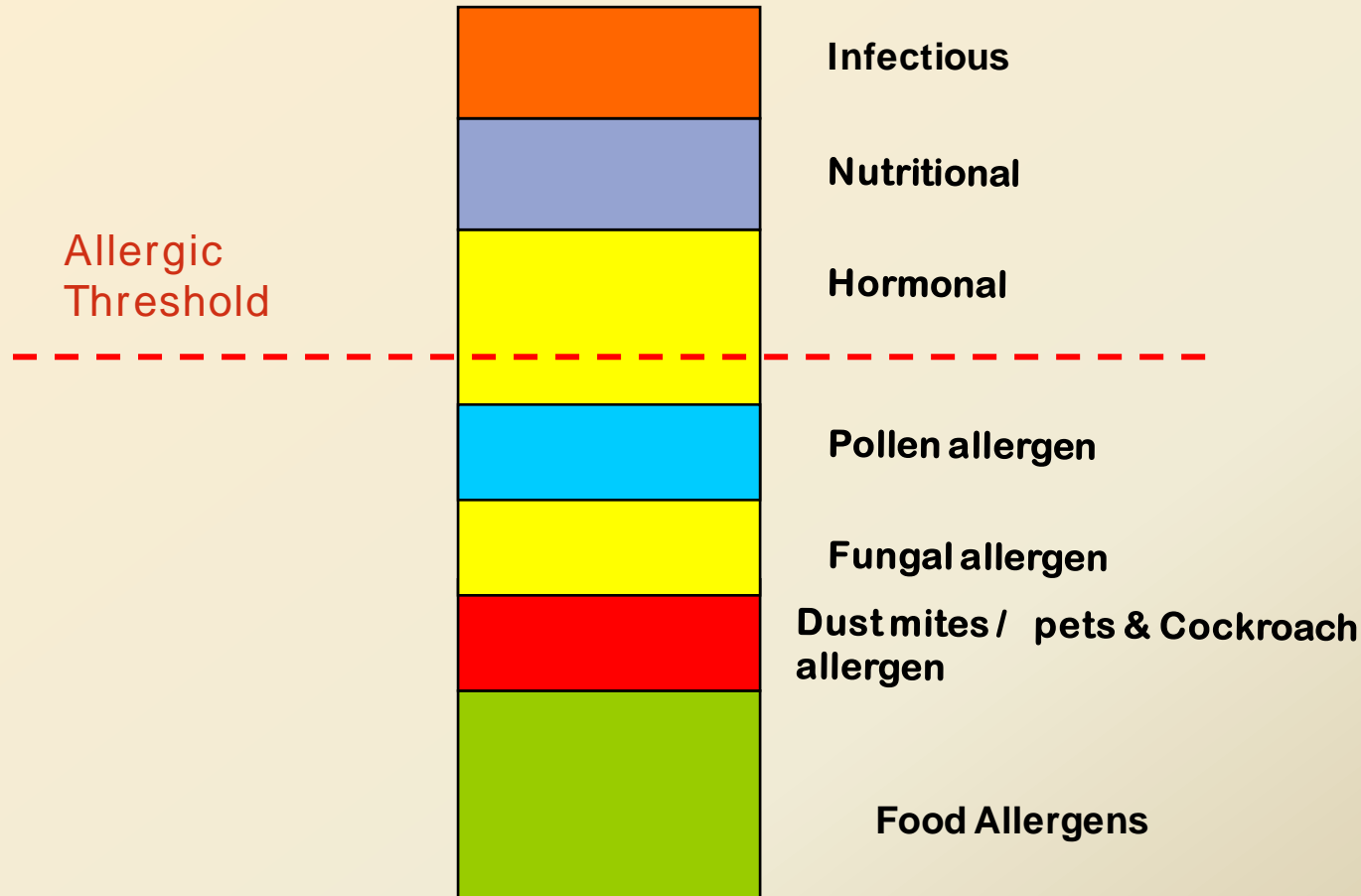
**SPECIFIC
IMMUNOTHER
APY
(SCIT/SLIT)**

Patient's exposure
(FOOD x
AEROALLERGENS)



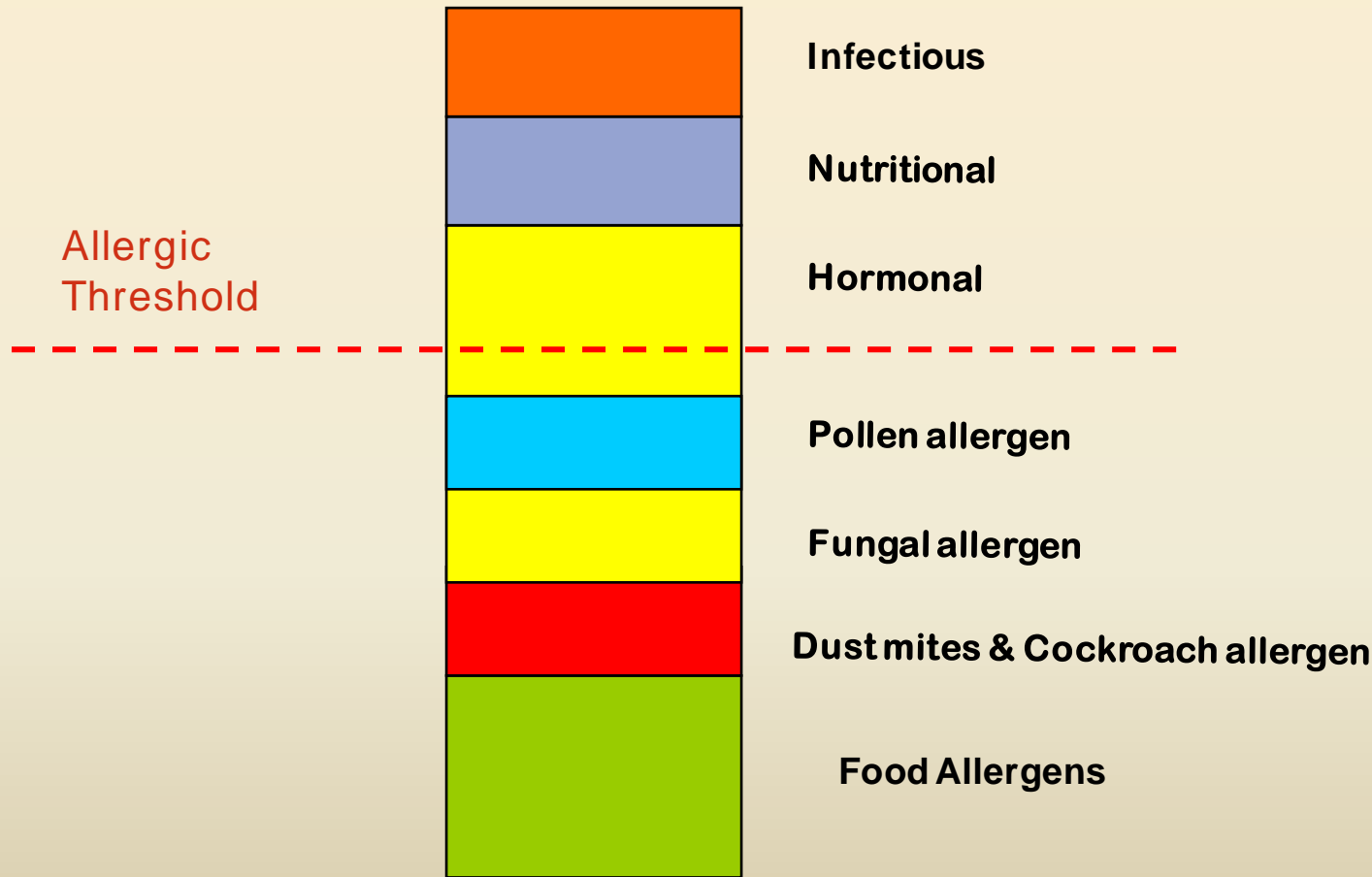
AVOIDANCE

Multiple symptoms, Multiple targets..(AR+AA+AC+AD+FA etc) Think total load



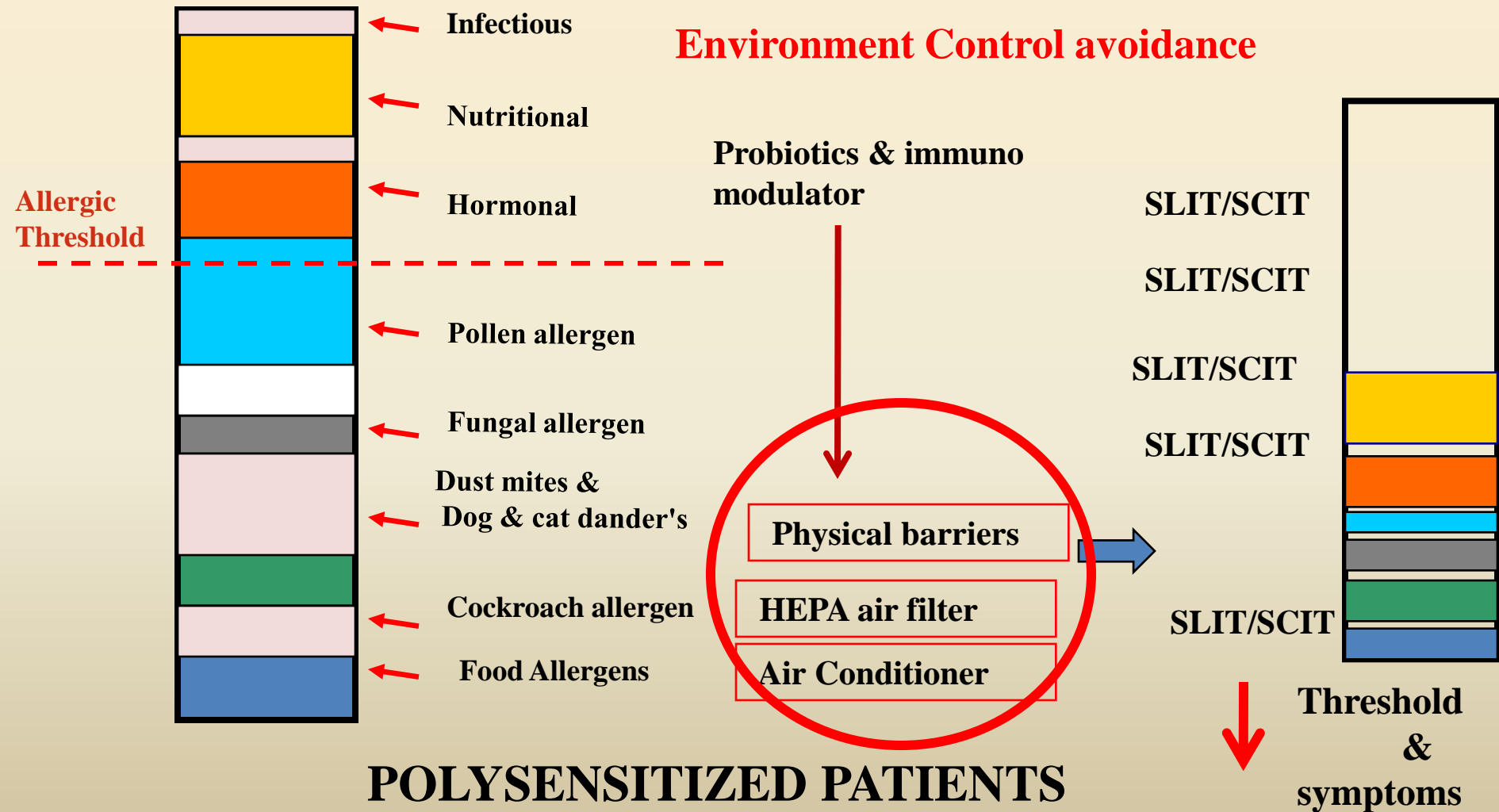
POLYSENSITIZED PATIENTS

↓ Reaction = ↓ Sensitivity x ↓ Load



POLYSENSITIZED PATIENTS

↓ Reaction = ↓ Load x ↓ Sensitivity

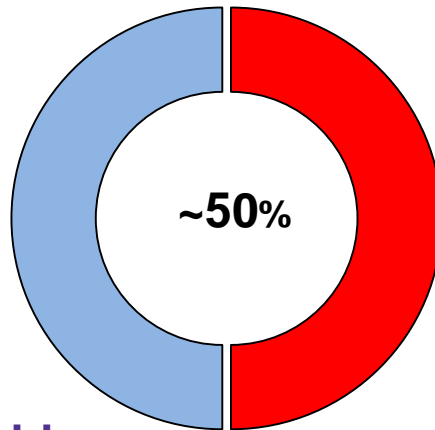


Percentage Prevalence of Allergens

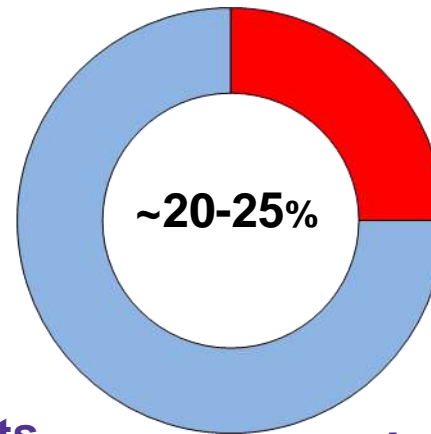
10µm
24-36 kD



House dust mite



Pollen

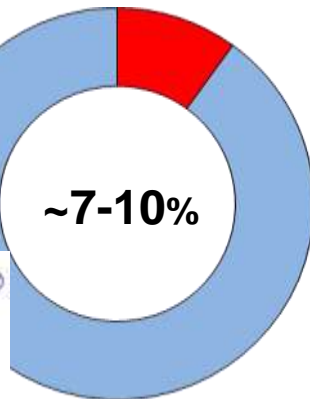


Bet v 1
5-20 µm
17 kDa



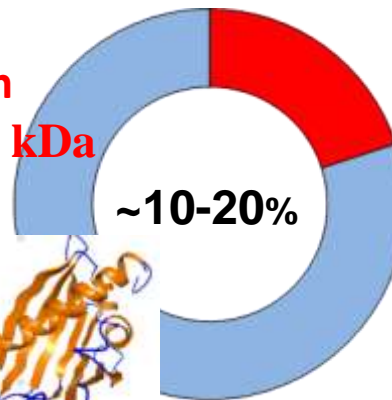
Mould

2.5-3.5 µm
11-57 kD



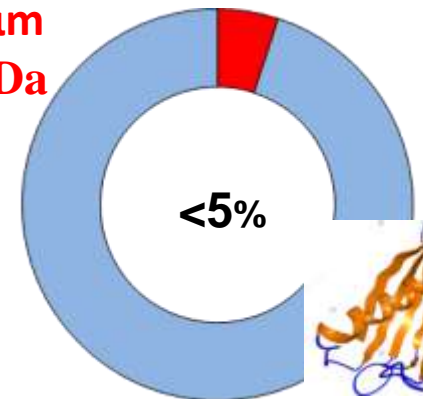
Insects

10 µm
17-35 kDa



Animal Dander

<6 µm
37 kDa



Size of allergen carrying particles & molecular weight of allergenic peptides (1:1000)

Global Prevalence Of Sensitivity To Allergens In Allergic Rhinitis (% Of Allergic Population)

Allergen	US	EU
• Grasses	56%	52%
• House dust mite	45%	49%
• Ragweed	49%	n/a
• Birch	23%	14%
• Weed	n/a	27%
• Japanese cedar	10%	n/a
• Cat	39%	30%
• Dog	19%	n/a



Allergen immunotherapy: A practice parameter third update

Chief Editors: Linda Cox, MD, Harold Nelson, MD, and Richard Lockey, MD

Source	Allergen	MW (kDa)	Properties	Particles	Release of protein	Size (mm)	Relative volume
Dust mite	Der p 1 Der p 2	29 15	Enzyme	Feces	Rapid	10–35	~1,000

- Mite body , skin & hair follicles 10um X 30 mints in Air
- 2-4 ug /gm dust = sensitization
- >10 ug/gm dust = asthma symptoms



SIZE OF ALLERGENS 1000 time smaller then the size of allergen caring particles (5—20μg)



Birch Tree

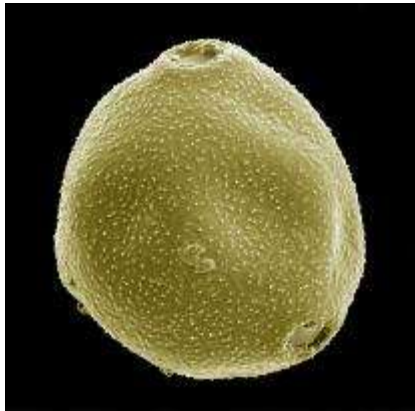


Collect
Pollen



(2-10 nm with
mw 5-50 kda)

Isolate
Pollen

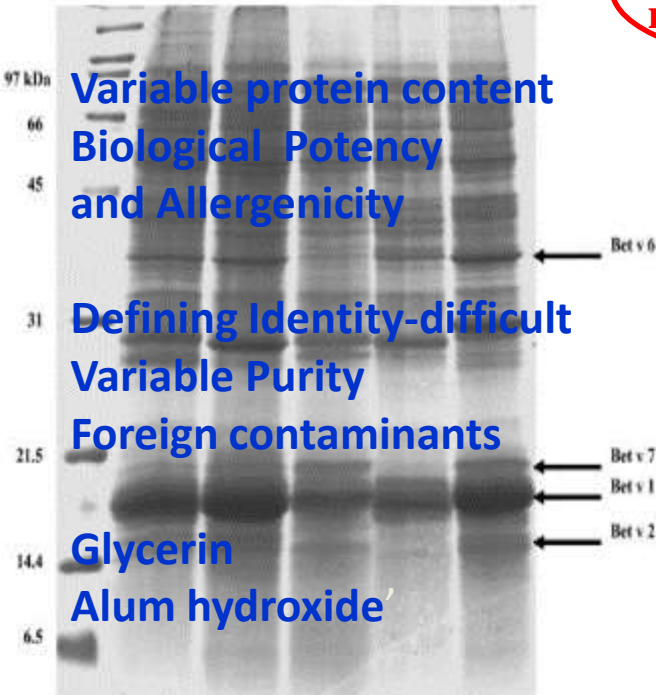


Per long time in
environment

cDNA clone
Isolated from pollen
expression library
Breiteneder et al.
EMBO J, 1989



Bet v 1
17 kDa



Variable protein content
Biological Potency
and Allergenicity

Defining Identity-difficult
Variable Purity
Foreign contaminants

Glycerin
Alum hydroxide



Perform
Aqueous
Extraction
Defat and
Analyze

IgE binding sites

Dendritic cells link innate and adaptive immunity

Innate Immunity

Recognition of pathogen associated molecular patterns (PAMPs) via a fixed repertoire of pathogen recognition receptors (PRRs) including TLRs`

Adaptive Immunity

- Specific activation and proliferation of B and T cells.
- Flexibility to respond to any antigen via versatile recombination of antigen receptors.
- Development of immunological memory.

Linear amino acid Sequence of antigenic epitopes

T-cells

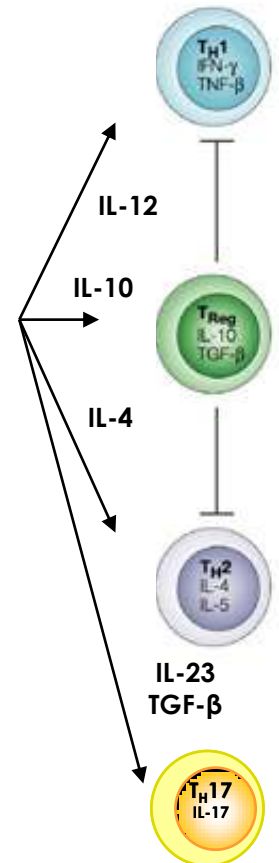
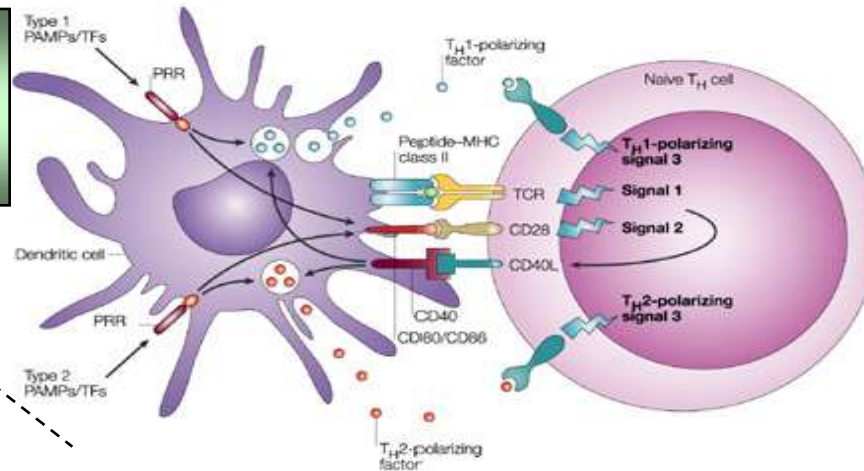
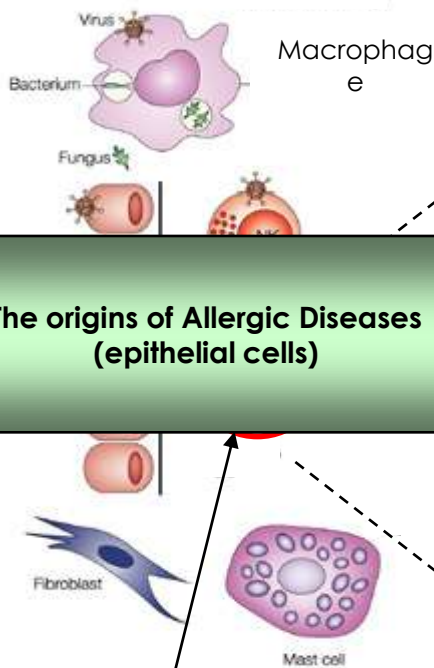
The origins of Allergic Diseases (epithelial cells)

Immature dendritic cell

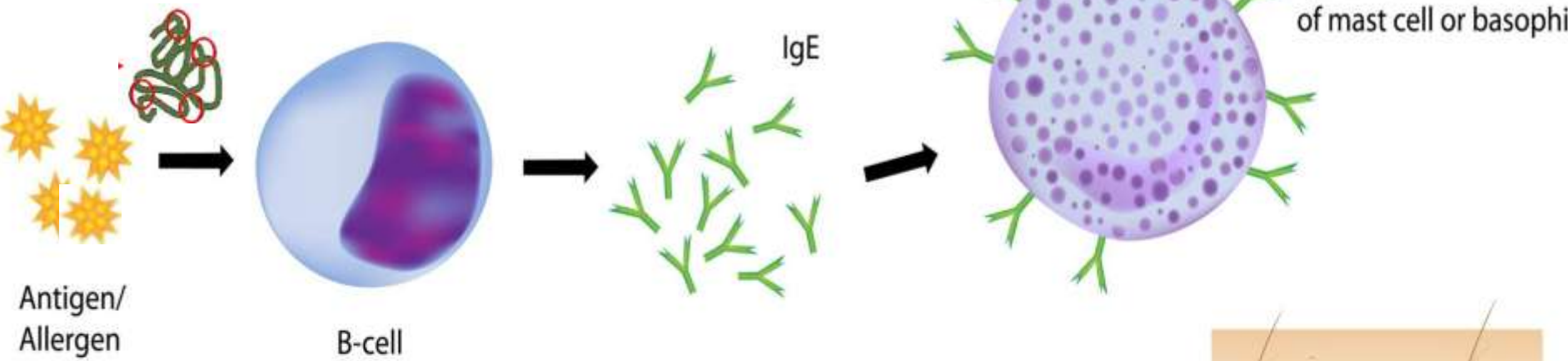
- Excellent antigen capture and processing
- Poor T cell stimulator

Mature dendritic cell

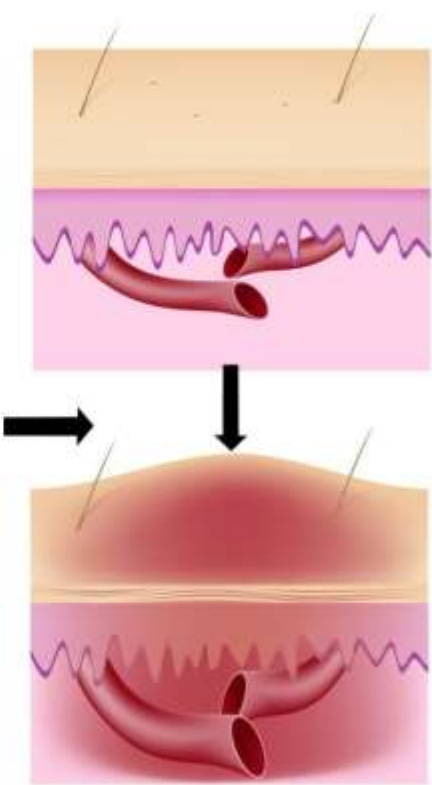
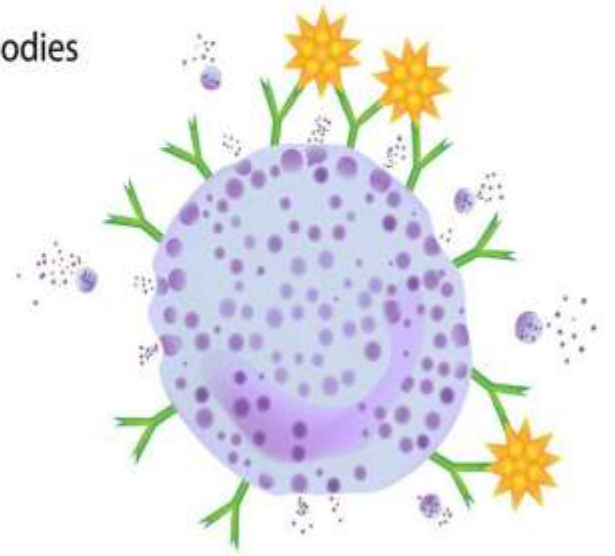
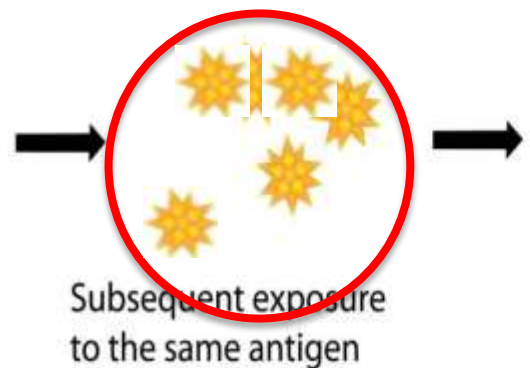
- Poor antigen capture and uptake.
- Up regulation of MHCII and co-stimulatory molecules **CD40, CD80, CD86.**



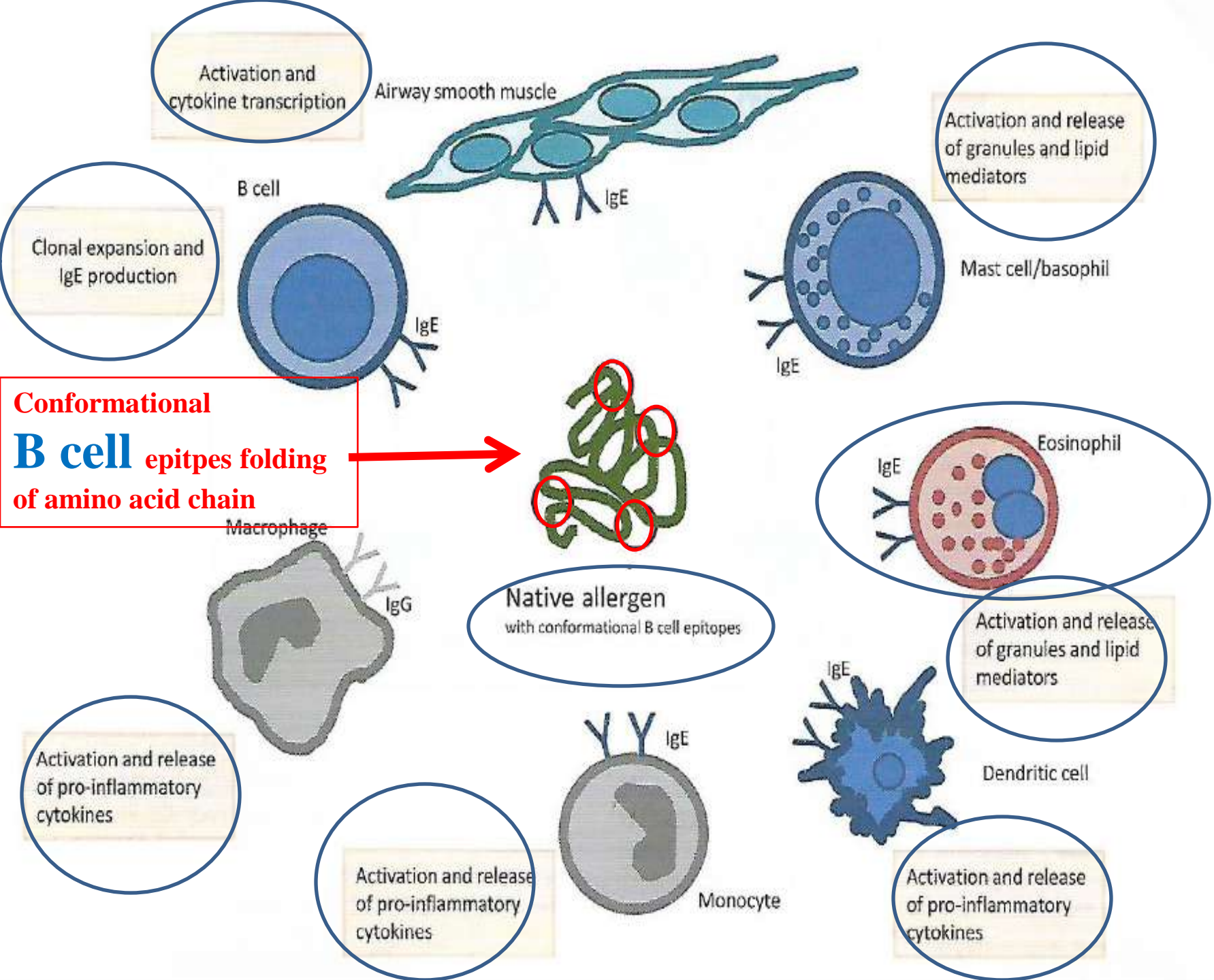
Conformational sequence of amino acid chain B cell epitopes (folding)



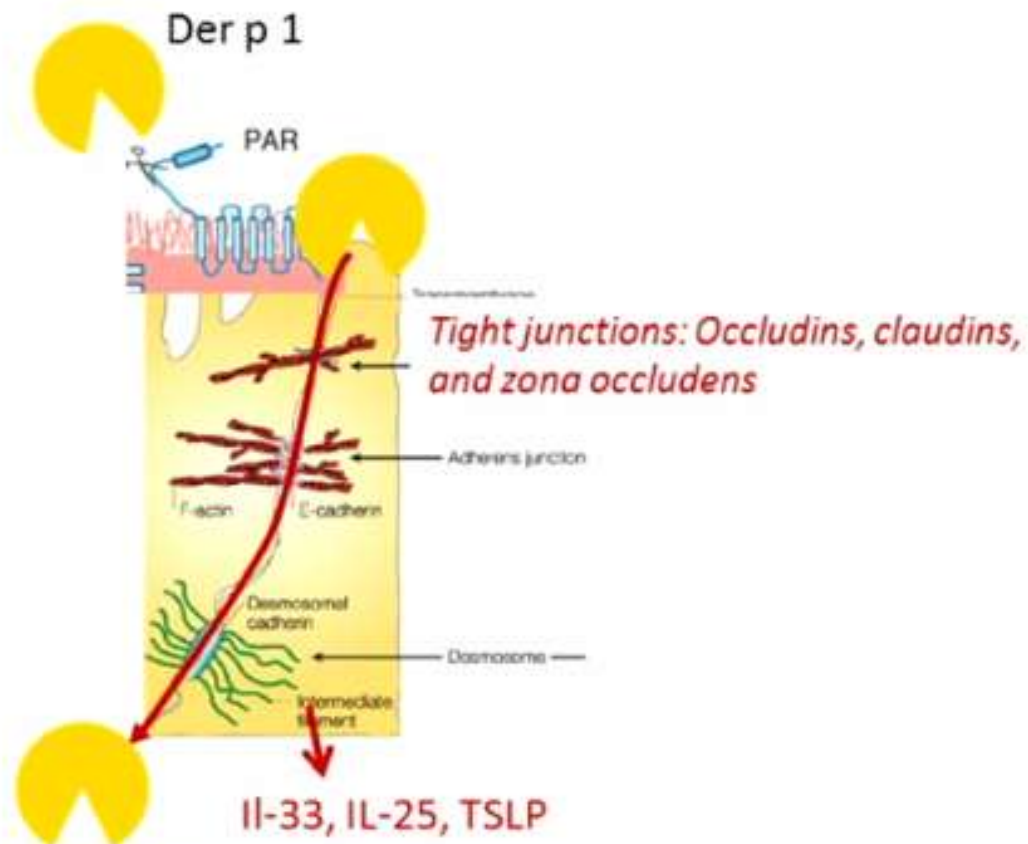
Antigen triggers production of IgE antibodies



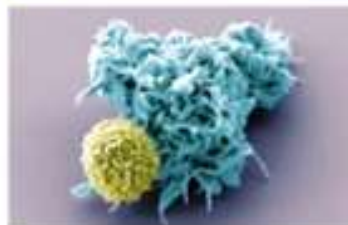
Histamine increases the permeability and distension of blood capillaries



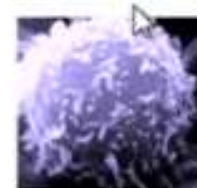
Cysteine and serine protease from Der p 1 can disrupt epithelial barrier and activate immune system



Mast cells and basophils



Dendritic cells



ILC2 and Th2

Mechanisms of allergy development

Allergic reactions are mediated by exposure to the offending allergen/s

Avoidance measures can reduce exposure & thereby reduce the symptoms in the patients

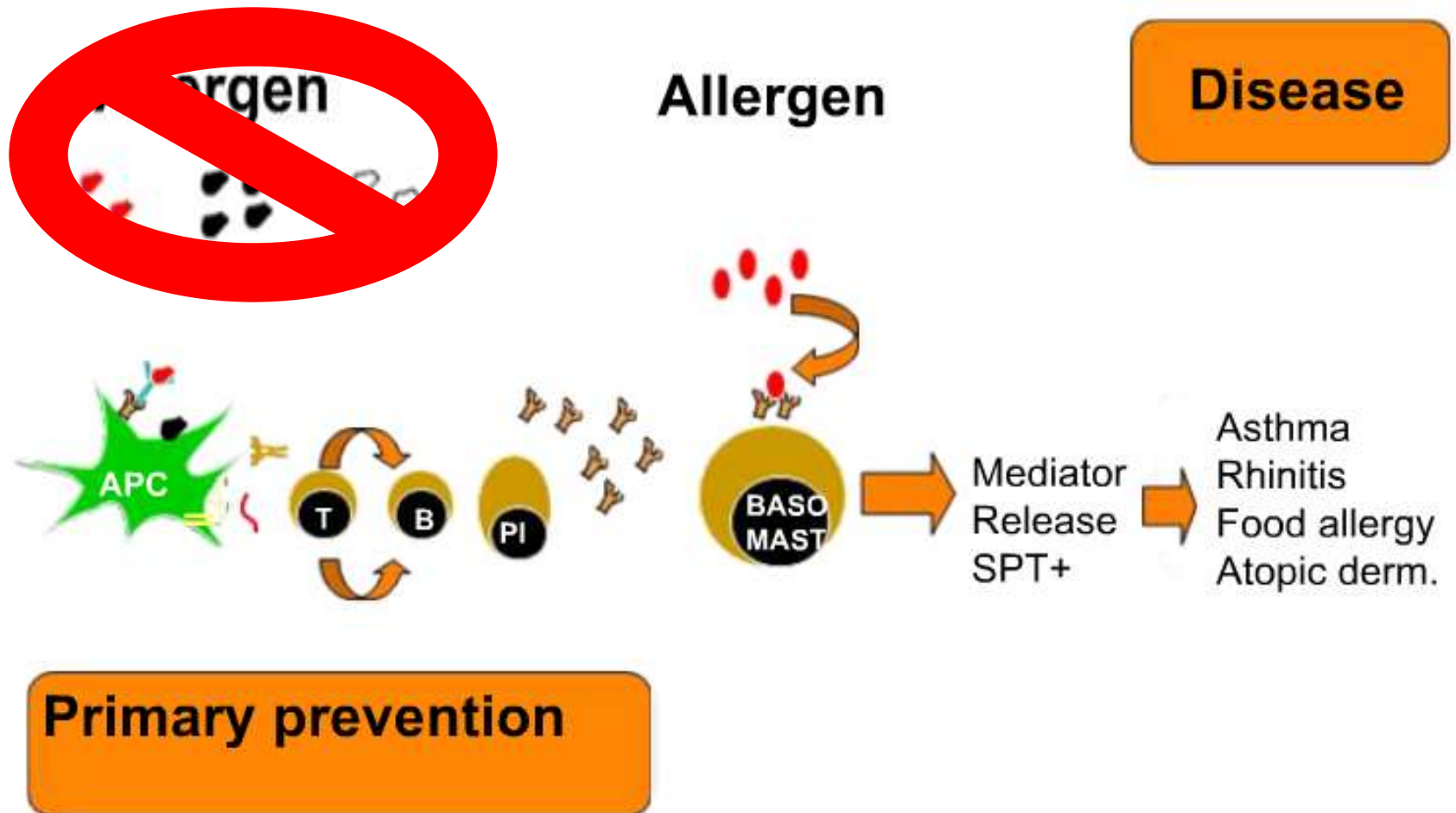
isease



sensitization phase

effector phase

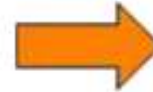
Strategy in allergy prevention **Primary**



❑ Allergen & microbial exposure

Prenatal intervention and allergy **Primary**

avoiding allergen
exposure: milk, egg,
*mites



no protection

- IgE, sIgE
- SPT
- Allergic disease

At age 1-8y:

- asthma
- wheezing phenotype
- eczema
- sIgE, SPT



mother

conception

birth

Fälth-Magnusson et al, JACI 1987+1992; Lilja et al, CEA 1989;
*Woodcock et al, AJRCCM 2004; Herrmann et al, Eur J Ped 1996

Why is there an Increase in Allergic Diseases?

Mother, fetus and infant interaction In the development of allergy



Allergen,
IgE,
Th2
promoters

Fetal
Swallowing



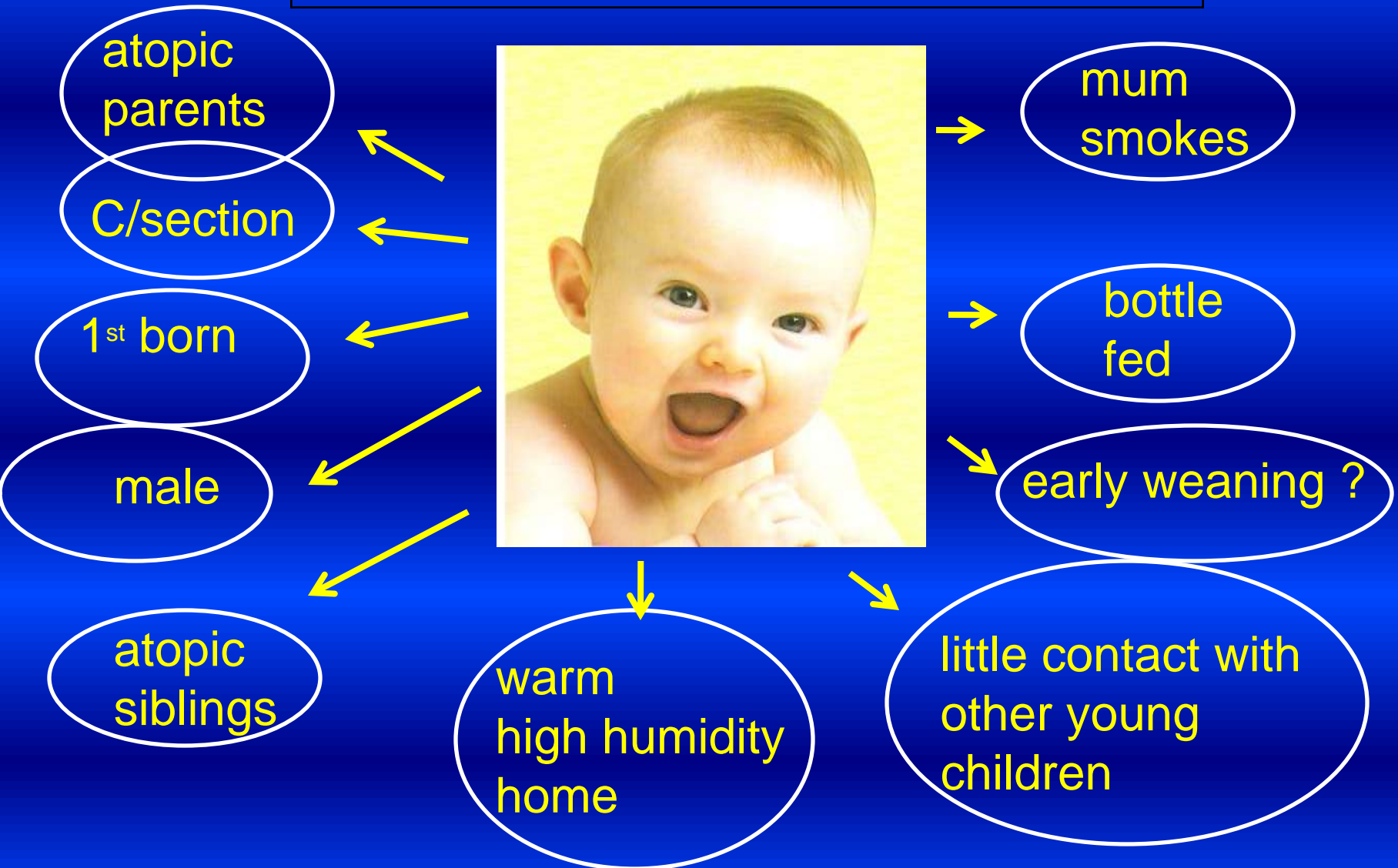
IgE
facilitated
allergen
uptake and
sensitization

❖ IgE Antibody

❖ Does not Cross the placenta

❖ Produced by Fetus from 6 weeks
onwards

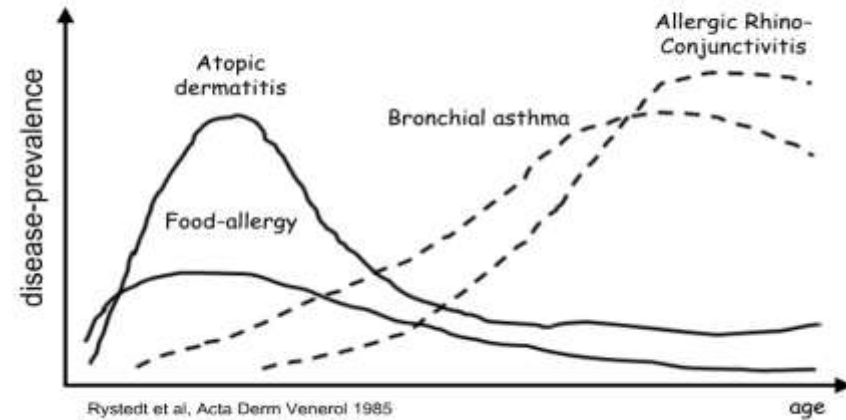
A 'Designer' Allergic Infant



The Allergy March Atopic Disease Progression



Natural course of allergic diseases



Rystedt et al, Acta Derm Venereol 1985
Lammintausta et al, Int J Dermatol 1991
Illi et al, JACI 2004

Environmental factors

Processing

Iatrogenic factors

Lifestyle

Diet (e.g. antioxidants)
Vitamin D (decreased sunlight)
Obesity and overweight
Physical inactivity
Alcohol



Genetics



Pre-existing allergies

Pre-existing diseases



Figure 1: The "Big Eight" Allergens: Tree Nuts, Peanuts, Soy, Egg, Milk, Fish, Wheat and Shellfish.

Food Allergenic Protein

Intervention and allergy development

Probiotics,
prebiotics



Variable effects,
no clear
protective effect



- † Kalliomäki et al, Lancet 2001 (pos effect)
- † Taylor et al, Prescott S, JACI 2007 (no effect)
- † Kukkonen et al, JACI 2007 (prevention of AD with pre+pro)
- † Prescott et al, CEA 2007 (no effect)
- † **Osborn et al, Cochrane Library 2007 (insufficient evidence)**
- † Kopp et al, Pediatrics 2008 (no effect)

mother

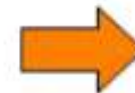
conception

birth



Prenatal intervention and allergy

Fish (PUFAs) $\omega 3$ and $\omega 6$ oils



No clear protective effect



- Peat et al, J Allergy Clin Immunol 2004 (no effect)
- Romieu et al, Clin Exp Allergy 2007 (pos effect)
- Dunstan et al, Clin Exp Allergy 2003 (pos effect)
- Dunstan et al, J Allergy Clin Immunol 2003 (pos effect)
- Olson et al, Am J Clin Nutr 2008 (pos effect)
- **Anandan et al, Meta-Analysis Allergy 2009 (no clear effect)**
- Lauritzen et al, Lipids 2005 (no effect)
- Marks et al, JACI 2006 (no effect)
- Mahrshahi et al, JACI 2003
- Kitz et al, PAI 2005 (no effect)
- van Gool et al, Am J Clin Nutr 2003 (no effect)

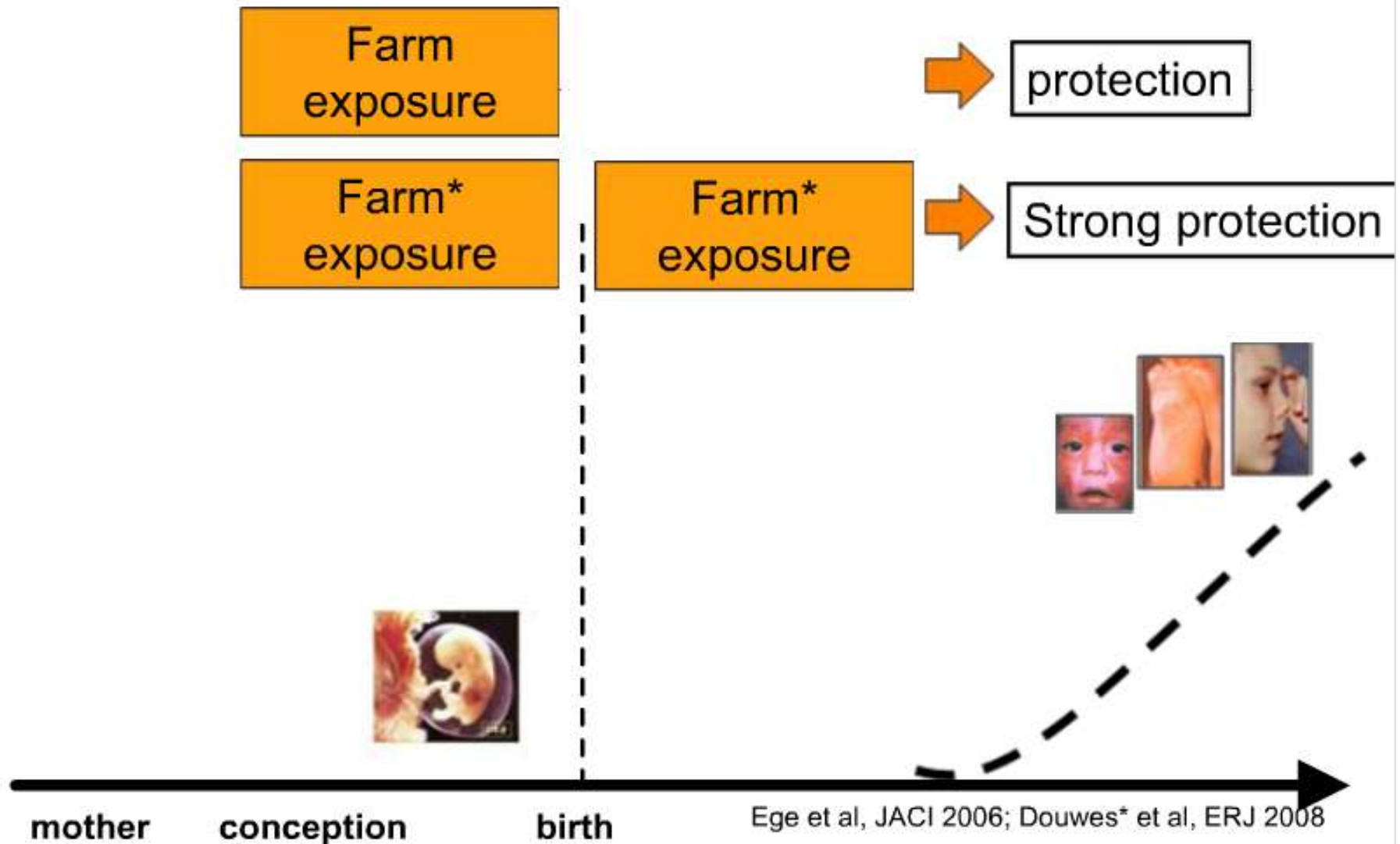
mother

conception

birth



Prenatal factor and allergy



Traditional farming and early “immuno-education”

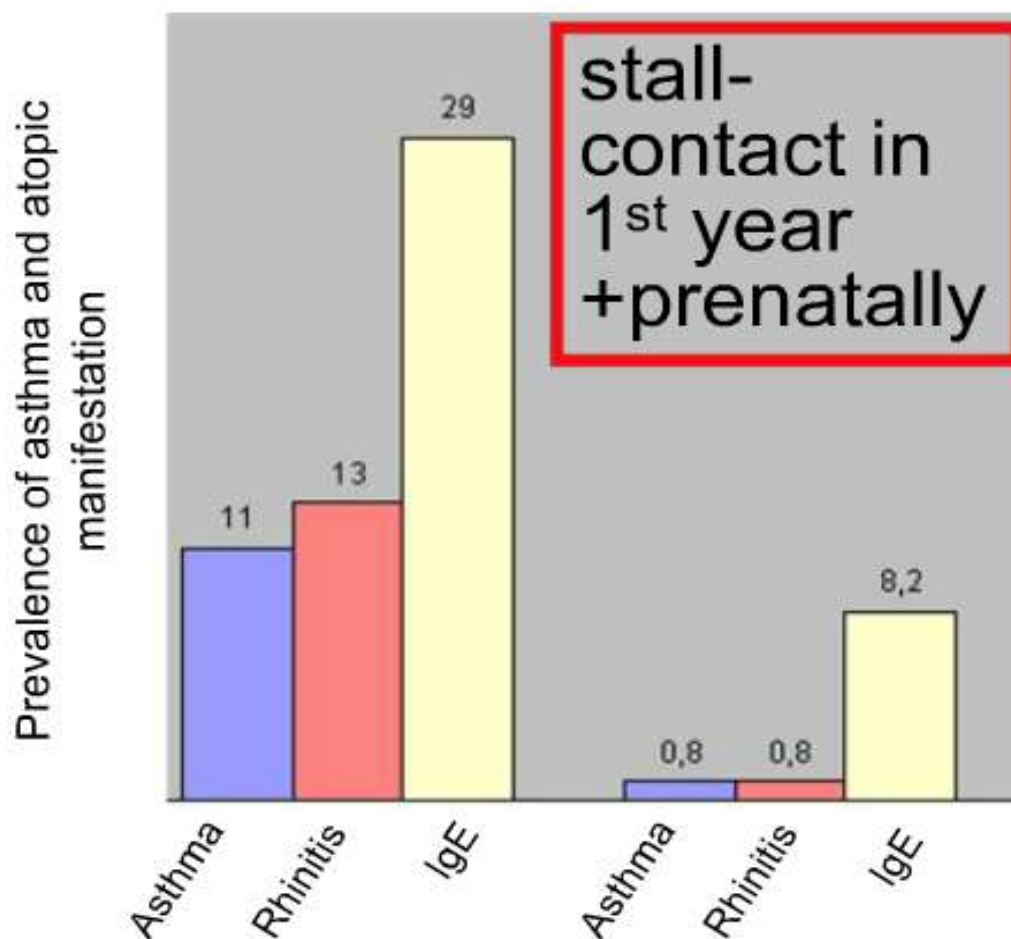
ALEX-Study (1998 – 2002)

EU-6FWP PASTURE (2002 – 2007); EU-7FWP PRO-IMMUNE (2008 – 2011)



Courtesy: Erika v. Mutius, Munich, Germany

Prevention of asthma and atopic manifestation through stall-contact



(observational controlled study, 2b, B)

Riedler et al., CEA 2000, Riedler et al., Lancet 2001, Von Mutius et al., CEA 2000, Lauener et al., Lancet 2002, Ege et al., JACI 2006, Douwes et al ERJ 2008

Prevention of asthma and atopic manifestation through stall-contact

Timing and quality
of environment
strongly affects
allergy protection!

Asthm

Rhinit

Ig

Asthm

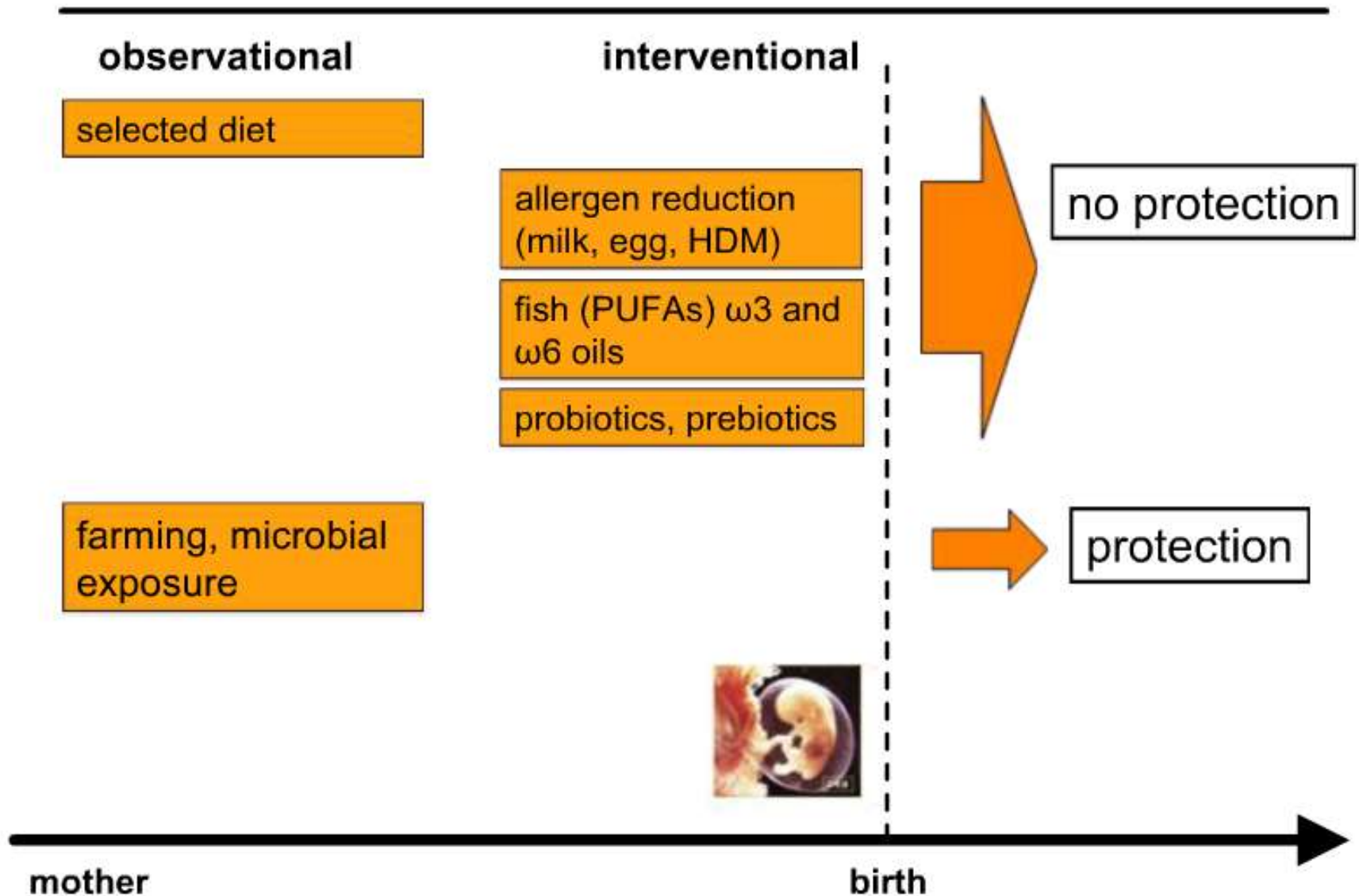
Rhinit

Ig

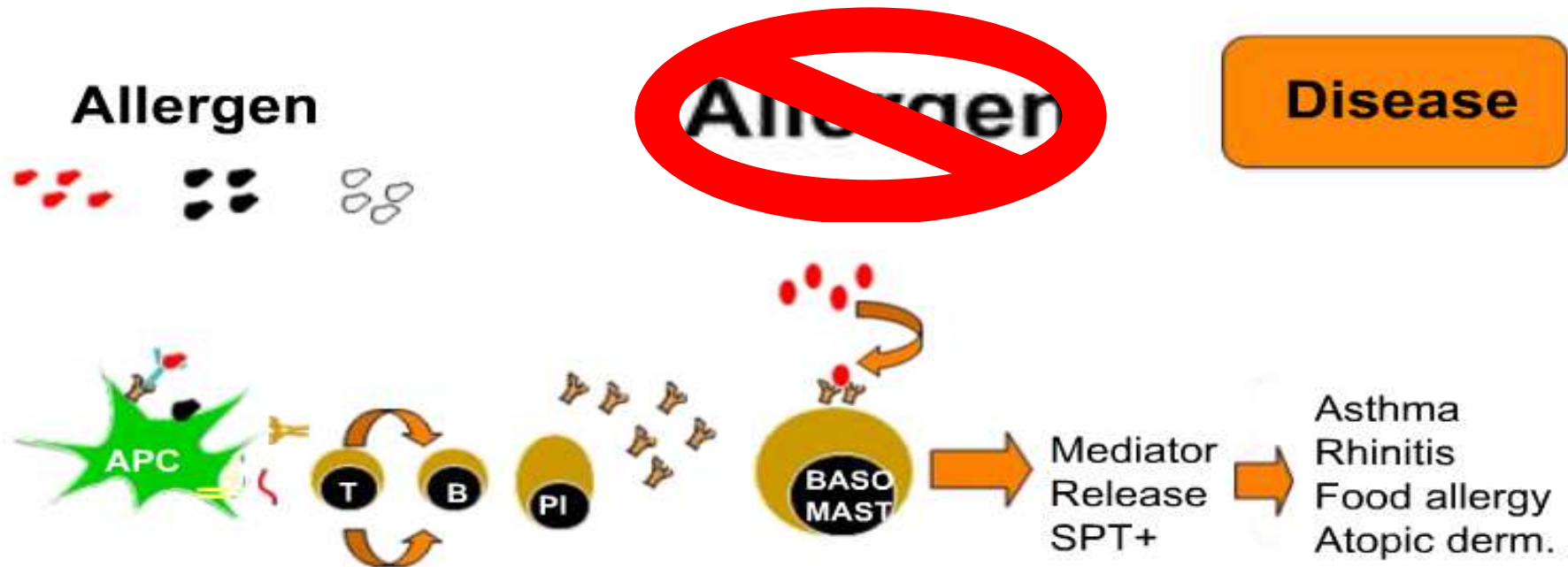
(observational controlled study, 2b, B)

Riedler et al., CEA 2000, Riedler et al., Lancet 2001, Von Mutius et al., CEA 2000,
Lauener et al., Lancet 2002, Ege et al., JACI 2006, Douwes et al ERJ 2008

Prenatal allergy prevention ?



Strategy in allergy prevention



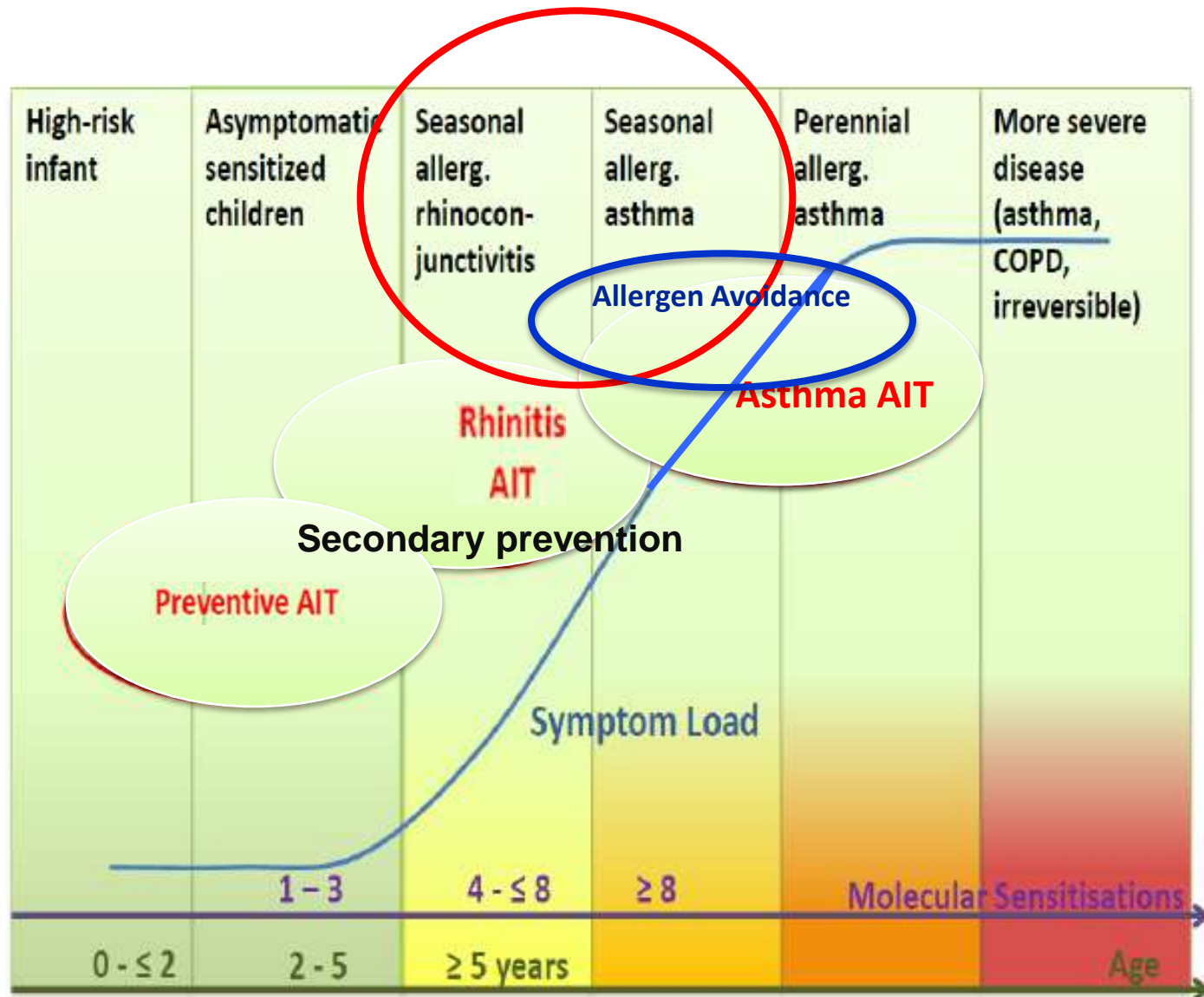
Secondary prevention

Tertiary prevention



Allergy Prevention by AIT & Allergen Avoidance

Age-Dependent Windows of Opportunity



Dust mite

- In most humid areas of the world, house dust mites are the **major source of allergens** in house dust
- Pyroglyphid mites are eight-legged and sightless (microscopic arthropods) (0.3 mm in length)
- Live on skin scales and other debris
- Very precarious water balance
- Mites growth dependent on
 - ❑ **water in ambient air** (not capable of searching for or drinking liquids)
 - ❑ relative humidity >50%
 - ❑ absolute humidity ≥ 6 g/kg
 - ❑ temperature of 65-80 °F (18.3-26.7 °C)

HDM Facts

- HDM are arachnoids
- Invisible to the naked eye
- *Dermatophagoides* (skin-eaters)
 - *D pteryonyssinus*
 - *D farinae*
- Require heat and humidity for growth
- Live on skin scales, organic debris, and fungi
- Lifecycle:
 - Reach adulthood in 3 to 4 weeks
 - Can colonize a home in 1 year
 - HDM bodies and feces are the allergens



- ❑ Dust mite particles are heavy and fall to the ground
- ❑ Found in woven materials such as mattresses, pillows, stuffed animals, bedding, upholstered furniture and draperies
- ❑ The highest levels of allergen are typically found in the mattress

Dermatophagoides pteronyssinus



Mites found in house dust from beds, carpets but also in public places; humid places



Atopic sensitization (6-40% of the general population)
Respiratory allergies (asthma/ allergic rhinitis, >50 %)
Atopic dermatitis



400 millions years old, class of the Arachnids, family of the Pyroglyphidae



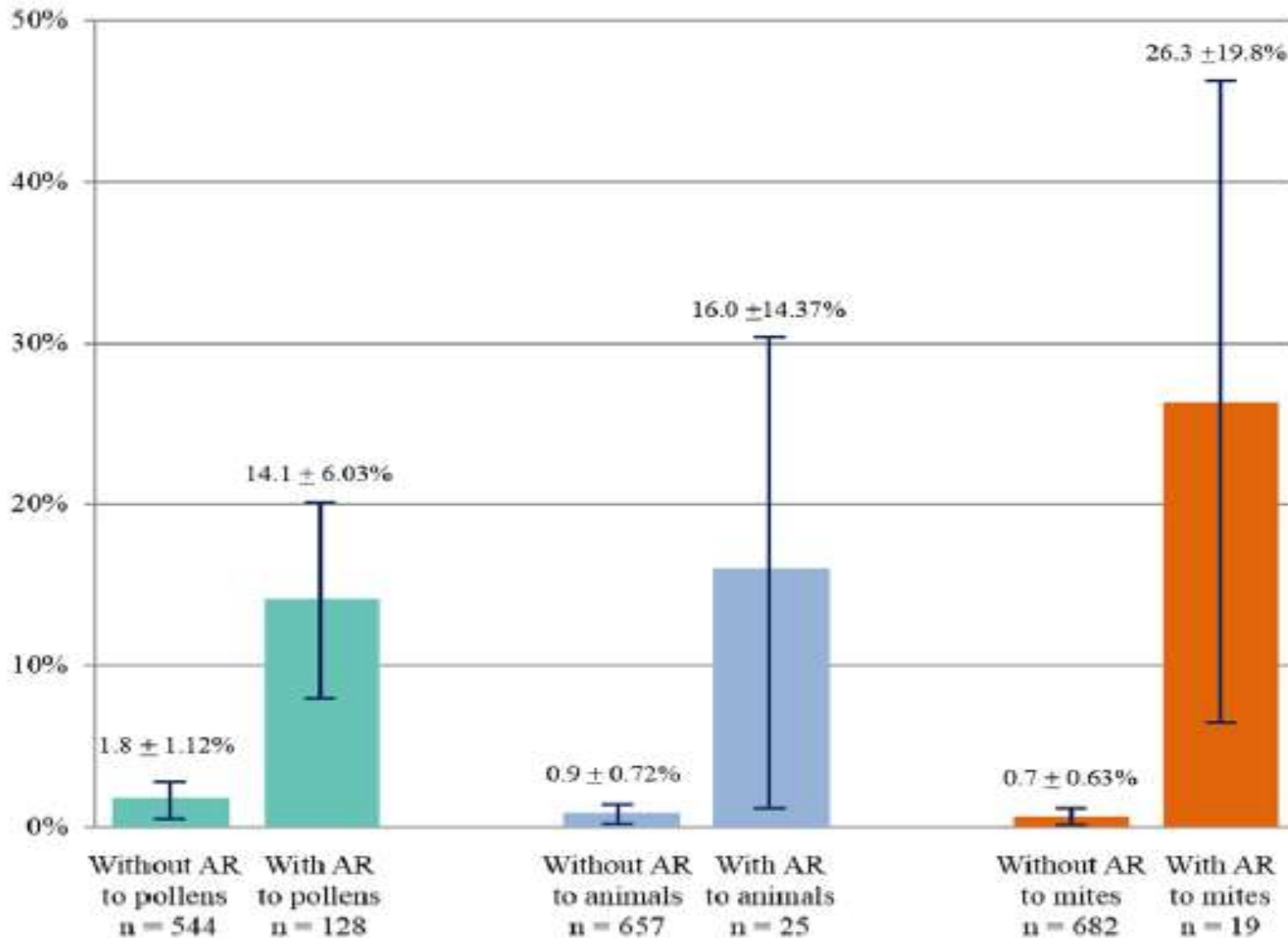
Recycle organic wastes such as skin and nails debris

House Dust Mite Allergy and Allergic Rhinitis

- HDMs are the most common cause of perennial AR
- 22% to 80% of the population are sensitized to HDM
- 10% to 30% of adults and 40% of children are affected by AR
- AR is associated with comorbidities, including:
 - Asthma
 - Sinusitis
 - Decreased quality of life
 - Sleep disorders



The risk of development of asthma in cases of AR is the highest in patients with sensitization to HDM





I'm allergic to dust mites, what can I do?

House dust mites and their allergens are difficult to avoid. Try to keep your house, and especially the living area and the bedrooms, dry and well ventilated. Avoid textile floor coverings. **To prevent the entry of allergen of <10um.**

If possible, let someone else do the cleaning. Mop the floors instead of vacuuming them.

It can be a good idea to encase pillows, quilts and mattresses in airtight covers that do not allow dust mites or their allergens to pass through. Alternatively, wash your pillow, blanket and bedding regularly at 60C. Previously, it was recommended that you put your pillow in the freezer regularly to reduce the number of dust mites, but this is unnecessary if you get a cover for your pillow and mattress that does not let the dust mites through. Ask your doctor for advice.

Use a vacuum cleaner with a HEPA (high efficiency particulate air) filter and double bags. You may also feel better if you avoid having dust-collecting textiles and furniture.

Environmental Controls for HDM Allergy

- Reduce household humidity to <50%
- Encase mattresses, box springs, pillows with covers that are <20 microns
- Wash all bedding, drapes, etc in hot water & dry in heated drier
- Remove carpeting (if possible), otherwise vacuum weekly with HEPA filter bag
- Freeze stuffed toys for 24 hours once weekly



These precautions alone are insufficient for significant improvements in symptomology.

Available Environmental Control Measures for HDM

Measures

Recommendations

Acaricides

→ Applications is **cumbersome and ineffective**.

Humidity control

→ Sustained reduction in humidity is **difficult to achieve**.

Air filters

→ Major HDM allergens are carried on larger particles & quickly settle after disturbance of the reservoir.
Therefore, they are not effective.

Remove carpets & soft toys

→ Carpet removal is expensive and of **unclear benefit**.

Allergen-
impermeable
encasings

→ First-line approaches to reduce dust mite allergen exposure along with washing the bedding in hot water

There are 4 basic types of allergen-barrier encasings

1. Vinyl 2. Laminates

The first 2 block all allergens, but are not permeable to air or water vapor and therefore are uncomfortable.

Effective BUT
Uncomfortable

3. Nonwoven microfiber fabric

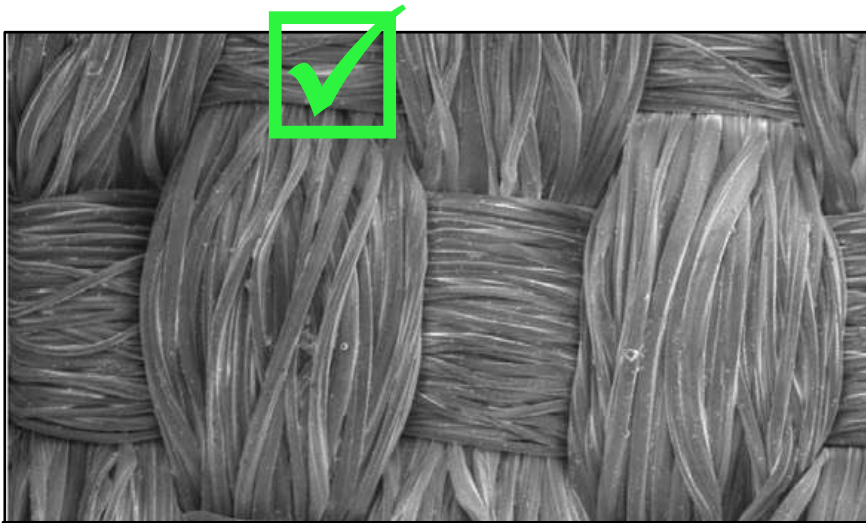
Do not succeed in decreasing allergen exposure and should not be used for allergen avoidance.

Not Effective

4. Woven microfiber fabric

Acts as a filter that prevents allergen escape yet allows air and water vapour to pass freely through the fabric.

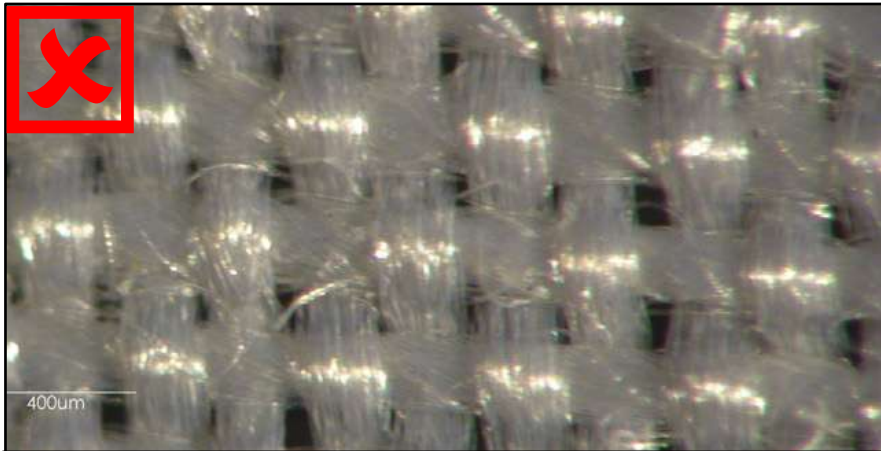
Effective & Comfortable



Tightly woven microfiber

< 10 μ m for HDM

< 6 μ m for CAT & Dog Allergen

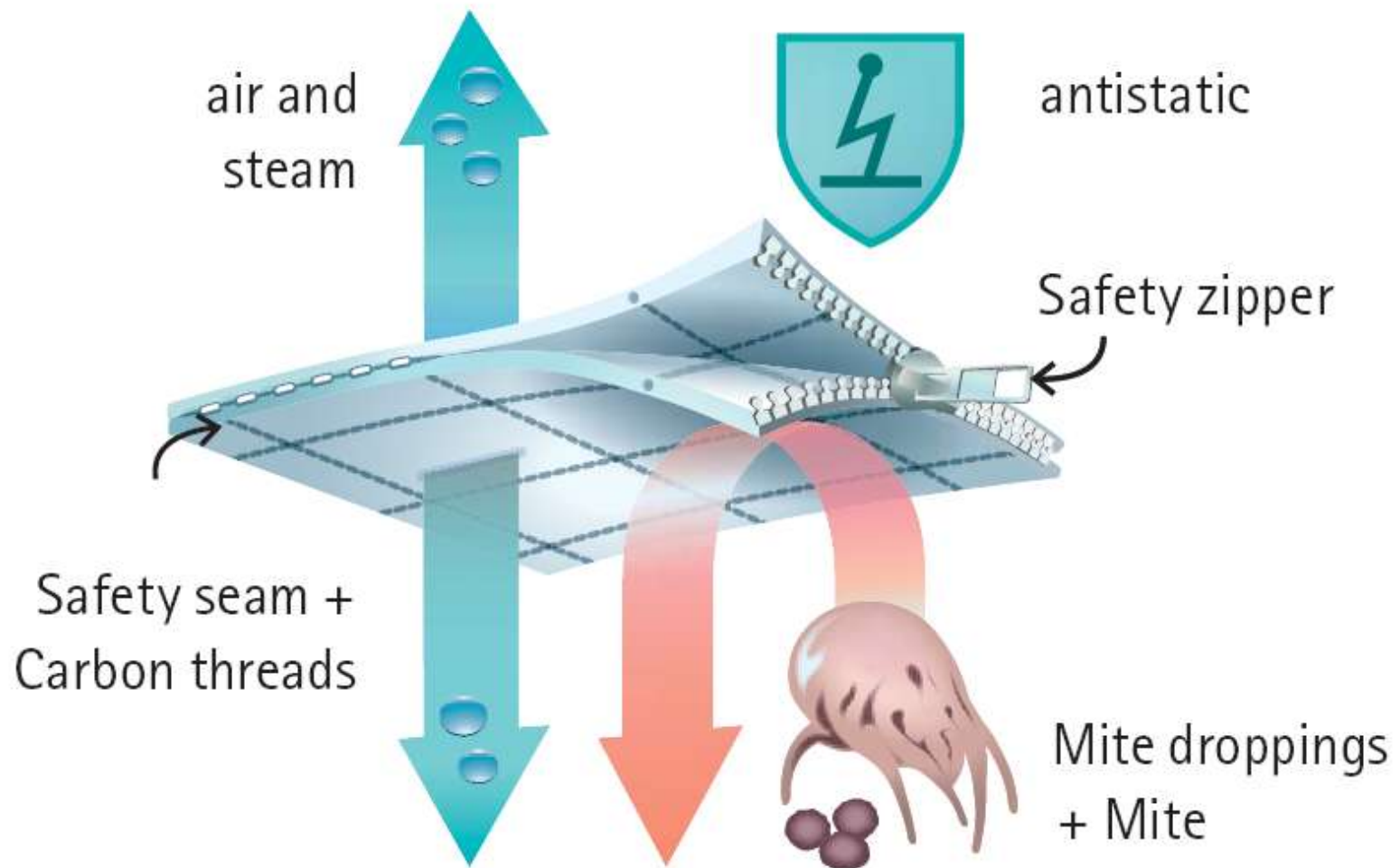


Loosely woven microfiber encasing
(light micrograph)



Dust mite penetrating non-woven
barrier fabric

Mechanism of Woven Microfiber Fabric

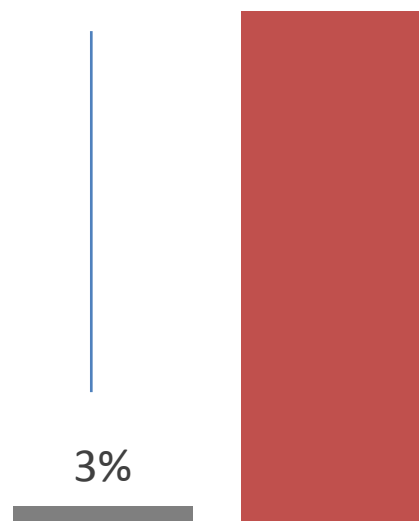


Results Of A Tightly Woven Allergen-and Mite Proof Encasing - Allergocover

Questionnaire based study evaluating the efficacy and comfort of Allergocover in users

Clinical state as having been good or very good

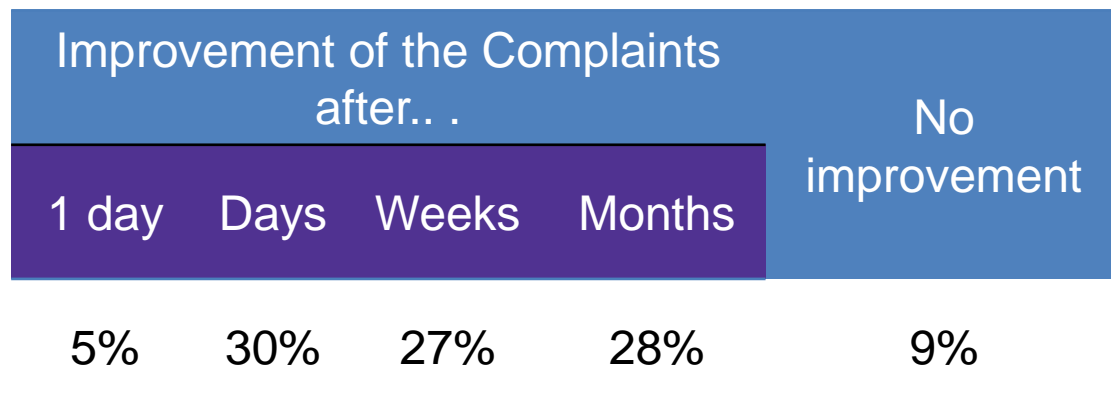
p < 0.001 — 86%



■ Before

■ After

Time during which a clinical improvement of the complaints took place after application of the encasings



Results Of A Tightly Woven Allergen-and Mite Proof Encasing – Allergo-cover

Assessment of comfort of lying and sleeping

Encasing	Comfort of lying or sleeping		
	No/little disturbance	Appreciable disturbance	No statement
Mattress	93%	2%	5%
Pillow	78%	11%	11%
Duvet	65%	28%	7%
Set	85%	10%	5%

Efficacy of Mite-proof Covers (tightly woven - Allergocover) One-Year, Double-blind, Placebo and Environment-controlled Study

Clinical Effects of Mite Allergen-impermeable (Active Group) and Mite Allergen-permeable (Placebo Group) Covers at Baseline and After 12 Months

	Allergocover			Placebo group		
	Baseline score	12-month score	<i>P</i> value	Baseline score	12-month score	<i>P</i> value
Symptom load	7.84 ± 4.0	4.2 ± 3.8	0.005	6.62 ± 3.5	6.54 ± 3.9	0.929
Nose symptoms	3.10 ± 1.9	2.19 ± 1.8	0.074	2.46 ± 1.1	2.40 ± 1.3	0.505
Eye symptoms	1.56 ± 1.4	0.62 ± 0.8	0.036	0.88 ± 1.2	0.95 ± 1.3	0.721
Lung symptoms	0.60 ± 0.7	0.2 ± 0.3	0.028	1.21 ± 1.0	1.11 ± 1.2	0.859
Anti-allergic drug use	1.84 ± 2.8	1.0 ± 2.8	0.091	1.55 ± 1.8	1.41 ± 1.7	0.484
Skin symptoms	0.74 ± 1.6	0.19 ± 0.3	0.499	0.53 ± 0.6	0.67 ± 0.9	0.237
Peak flow (l/min)	524 ± 100	529 ± 93		507 ± 97	518 ± 82	
ECP (µg/l)	13.9 ± 8.4	15.1 ± 7.3		15.8 ± 12.4	16.5 ± 10.0	

The symptom load is the sum of nose, eye, lung, skin symptoms and antiallergic drug use. Mean scores ± SD are given.

Educating Patients On Pet Allergens Ubiquitous

- The allergens can scatter easily in the air and sticks to furniture and clothing
- Cat allergen may take 4 months to denature

DOG :-

Source - Skin & hair follicles sebaceous gland , salivary glands & urine

$2\mu\text{g/gm}$ of the dust = sensitization

$10\mu\text{g/gm}$ of the dust = asthma symptoms



Source	Allergen	MW (kDa)	Properties	Particles	Release of protein	Size (mm)	Relative volume
Cat	Fel d 1	38	CCSP ¹	Dander	Rapid	2–20	20–200
	Fel d 2	—					

Source - Skin & hair follicles sebaceous gland , salivary glands & urine

$1\mu\text{g/gm}$ of the dust = sensitization

$8\mu\text{g/gm}$ of the dust = asthma symptoms

Pet Allergen Avoidance



- **Reduces the amount of pet allergen indoors**
- If possible, find another home for the pet, and do not introduce new animals into the home.
- If the pet is not removed from the home, these measures may be helpful;
- Exclude pets from bedrooms and if possible keep pets outdoors
- Vacuum carpets, mattresses and upholstery regularly.
- Change clothes before going to school/work if you have had contact with any animal (for example, horse/cat/dog)

☐ Encase of mattress & pillows with bad encasing (pore diameter <6 um)

☐ Keep the pet clean with frequent washes

☐ Use HEPA air filter

Educating Patients on Cockroach Allergens

Seeing a **COCKROACH on your bed is not a problem actually...**

The real problem starts when it **DISAPPEARS!**

Kitchen



SmilePls.com

Cockroach allergen is found in the saliva, fecal material, secretions, cast skins and debris

These particles are large and settle quickly to the ground

These allergens are commonly found in areas of increased population density

- The highest levels of allergen are typically found in the kitchen

Saliva fecal material secretions dead cockroach body

0.04 $\mu\text{g/gm}$ of dust = sensitization

0.08 $\mu\text{g/gm}$ of dust = asthma symptoms

Allergen Avoidance Cockroach

- Removes the cockroaches, eliminates the places and conditions in which they can live, and removes allergens
- Eradicate cockroaches with appropriate insecticide bait
- Seal cracks in floors and ceilings
- Enclose all food
- Do not store waste in the home
- Scrub floors with water and detergent to remove allergens



Environmental assessment and exposure reduction of cockroaches: A practice parameter

Jay Portnoy, MD, Ginger L. Chew, ScD, Wanda Phipatanakul, MD, MS, P. Brock Williams, PhD, Carl Grimes, HHS, CIEC, Kevin Kennedy, MPH, Elizabeth C. Matsui, MD, MHS, J. David Miller, PhD, David Bernstein, MD, Joann Blessing-Moore, MD, Linda Cox, MD, David Khan, MD, PhD, David Lang, MD, Richard Nicklas, MD, John Oppenheimer, MD, Christopher Randolph, MD, Diane Schuller, MD, Sheldon Spector, MD, Stephen A. Tilles, MD, Dana Wallace, MD, James Seltzer, MD, and James Sublett, MD

- Integrated pest management with a combination of interventions appears to be the most effective method for preventing and eliminating cockroach infestations.

(Strong Recommendation, B Evidence)

Several reports of reductions on the order of 99% in dust-borne allergens have been reported.

Educating Patients On Mould Allergens



Bathroom,
Basement
Bedroom
Laundry Room

- Outdoor mould spores typically peak in June and decrease after the first frost
- Mould spores are found in soil, seeds, and vegetable matter such as grass or leaves
- Indoor moulds are prominent in humid environments

Source	Allergen	MW (kDa)	Properties	Particles	Release of protein	Size (mm)	Relative volume
<i>Aspergillus</i>	Asp f 1	18	Ribotoxin	Spores	Slow ²	1–3	1–10

Allergen Avoidance Mould

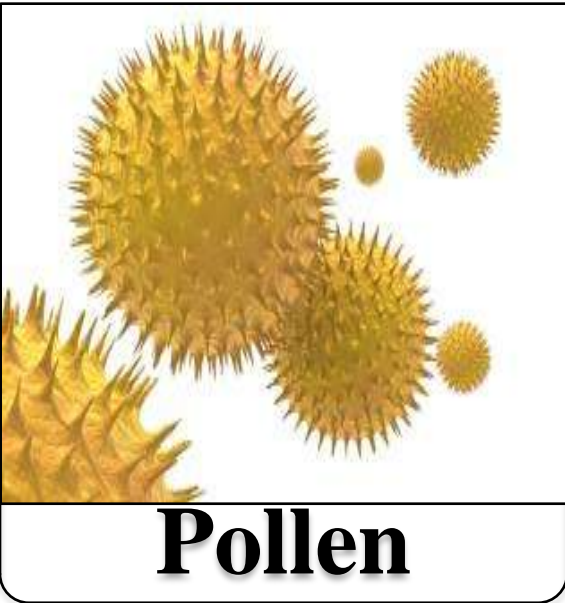
Reduce Humidity <50% Indoors

Prevents mould from growing, and mould spores from becoming airborne during mould removal Indoors:

- **Use dehumidifiers in the home if relative humidity is constantly high (above 50%)**
- **Ensure heating, ventilation or air-conditioning systems are properly maintained**
- **Use 5% ammonia solution to remove mould from bathrooms and other contaminated surfaces**
- **Replace carpets with hard flooring; replace wallpaper with paint**
- **Repair indoor water damage immediately**



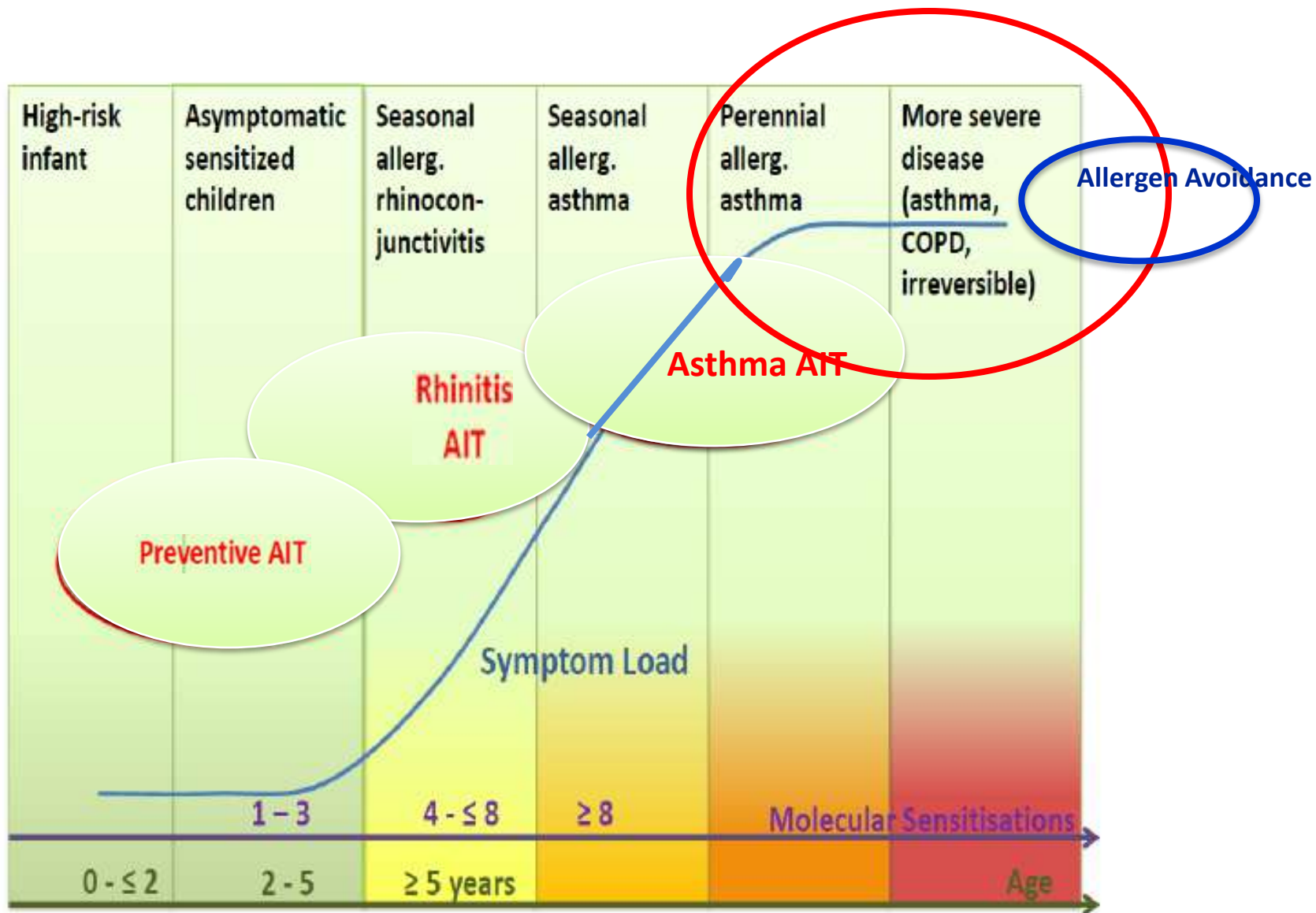
Pollen Avoidance



- **Keep windows closed at peak pollen times.**
- **Wear glasses or sunglasses to help prevent pollens entering the eyes**
- **Consider wearing a mask over nose and mouth to prevent inhalation of pollens at peak time**
- **Use air-conditioning where possible**
- **Install car pollen filters where possible with HEPA filter**
- **Take frequent bath to remove allergen residues on hair and body**

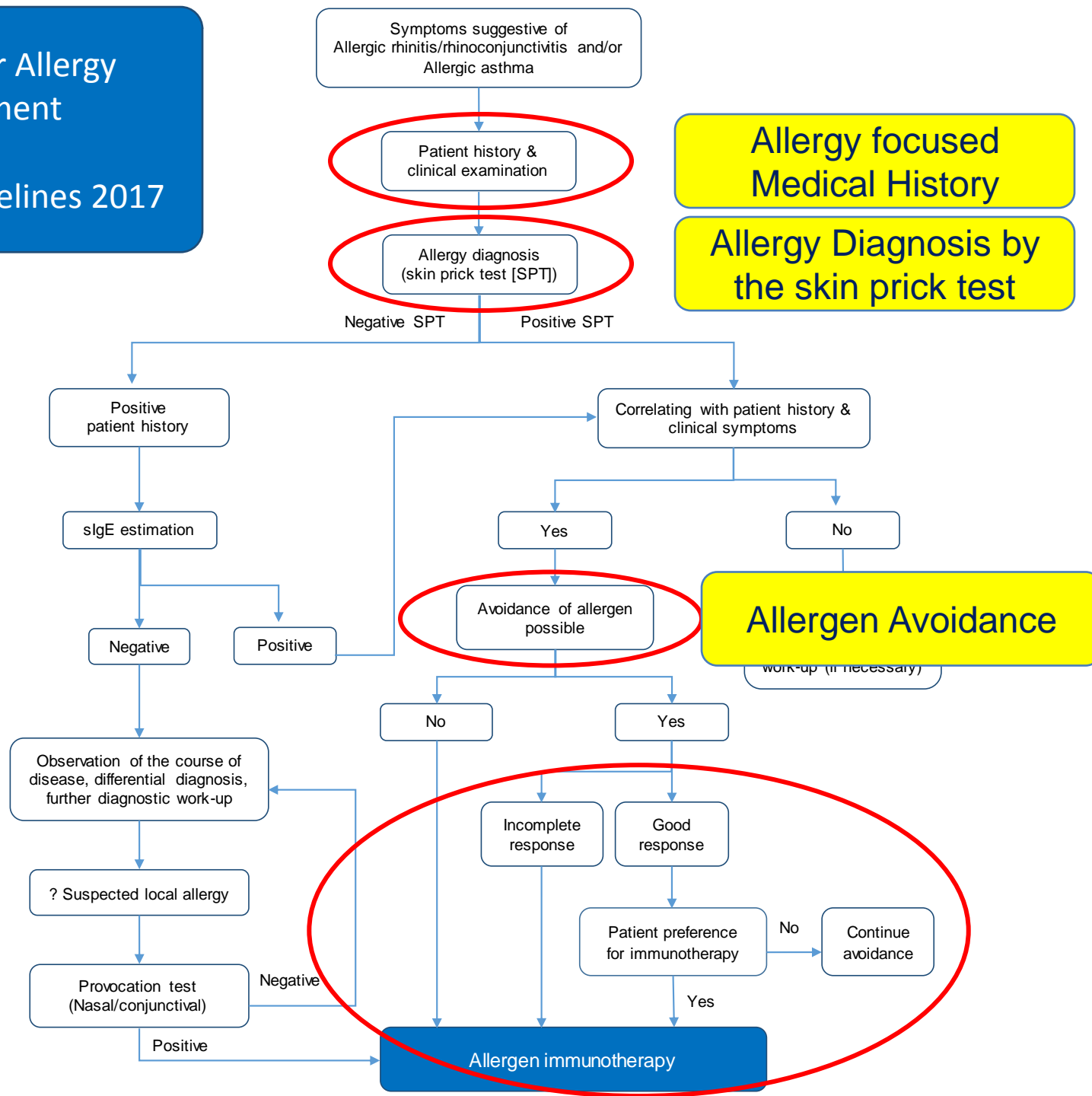
Allergy Prevention by AIT & Allergen Avoidance

Age-Dependent Windows of Opportunity



Algorithm for Allergy Management

Indian AIT Guidelines 2017



Pharmacotherapy may be initiated following the initial visits and SPT
AIT should not be given only on the basis of serum specific IgE

Summary

Allergen avoidance can be initiated following appropriate diagnosis

- It can be added to symptomatic pharmacotherapy and initiated before AIT
- Environmental control strategies are tailored to each potentially relevant indoor exposure and are based on knowledge of the sources and underlying characteristics of the exposure
 - strategies include source removal, source control, and mitigation strategies
- Individually tailored environmental control measures have been shown to
 - reduce asthma symptoms and exacerbations,
 - are similar in efficacy to controller medications, and
 - appear to be cost-effective when the aim is to reduce days of symptoms and their associated costs
- The efficacy of environmental control measures has been sustained for up to 1 year after the intervention

Thanks

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