

Phadia ImmunoCAP System™



ImmunoCAP technology

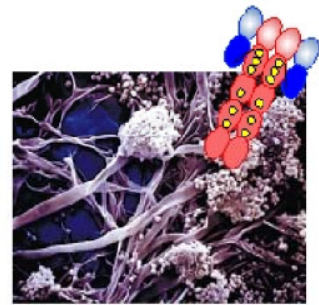
Unequaled performance!

Why and how?

The Facts

...involved in specific IgE testing

- ① IgE - one of five immunoglobulin classes
- ② Extremely low serum concentration of specific IgE
- ③ Allergen characteristics
- ④ Multitude of allergen sources
- ⑤ Complexity of an allergen source
- ⑥ Variation of allergen sources
- ⑦ Diversity of patient IgE specificities



The Facts

IgE - one of five immunoglobulin classes

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IgE



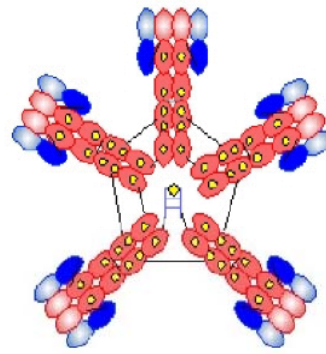
IgG1



IgA1



IgD



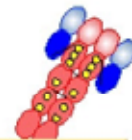
IgM

- | | |
|--|-----------------------------|
| | Variable domain light chain |
| | Constant domain light chain |
| | Variable domain heavy chain |
| | Constant domain heavy chain |
| | Carbohydrate chain |

The Facts

Extremely low serum concentration of specific IgE

Physicochemical properties of human immunoglobulin classes



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| Property | Immunoglobulin type | | | | | | | | | |
|------------------------------|---------------------|------------|------------|------------|-------|------------|------------|-------------------|----------|----------------|
| | IgG1 | IgG2 | IgG3 | IgG4 | IgM | IgA1 | IgA2 | sIgA | IgD | IgE |
| heavy chain | γ_1 | γ_2 | γ_3 | γ_4 | μ | α_1 | α_2 | α_2/α | δ | ϵ |
| mean serum conc. (mg/ml) | 9 | 3 | 1 | 0.5 | 1.5 | 3.0 | 0.5 | 0.05 | 0.03 | 0.00005 |
| sedimentation constant | 7s | 7s | 7s | 7s | 19s | 7s | 7s | 11s | 7s | 8s |
| mol. wt ($\times 10^3$) | 146 | 146 | 170 | 146 | 970 | 160 | 160 | 385 | 184 | 188 |
| half-life (days) | 21 | 20 | 7 | 21 | 10 | 6 | 6 | ? | 3 | 2 |
| % intravascular distribution | 45 | 45 | 45 | 45 | 80 | 42 | 42 | trace | 75 | 50 |
| carbohydrate (%) | 2-3 | 2-3 | 2-3 | 2-3 | 12 | 7-11 | 7-11 | 7-11 | 9-14 | 12 |

IC-11

Reference: Immunology, 5th ed., Roitt, Brostoff, Male, 1998

The Facts

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Allergen characteristics



- No common structure
- Proteins / glycoproteins, haptens
- Molecular weight 5 000 - 150 000 Da
- Isoelectric point 4 - 7
- Allergen determinants:
 - Sequential and conformational

The Facts

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Multitude of allergen sources

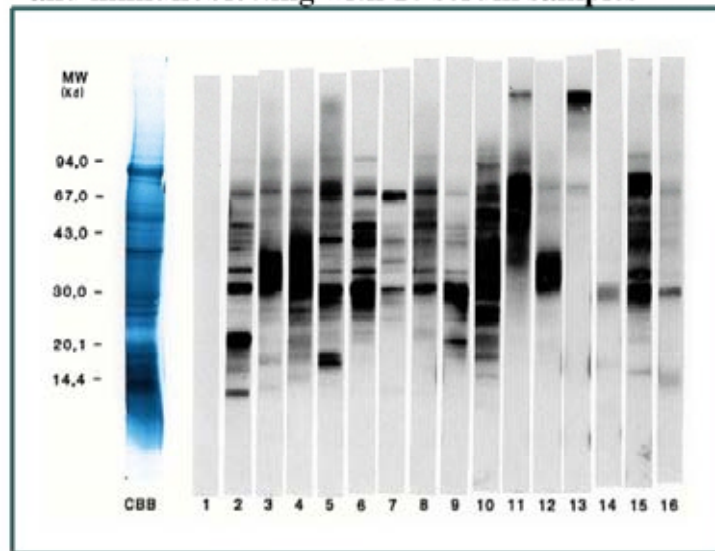


The Facts

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Complexity of an allergen source

SDS-gPAGE of an allergen
and immunoblotting with 16 serum samples



W. Rolfsen et al, 1987

The Facts

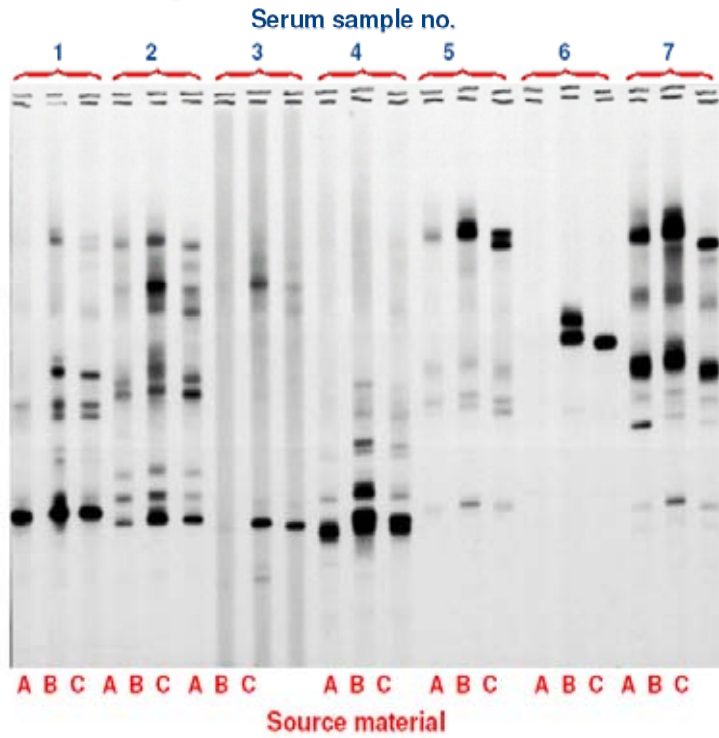
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IC-15

Variation of allergen sources

Immunoblotting: Source material comparison, *Aspergillus fumigatus*

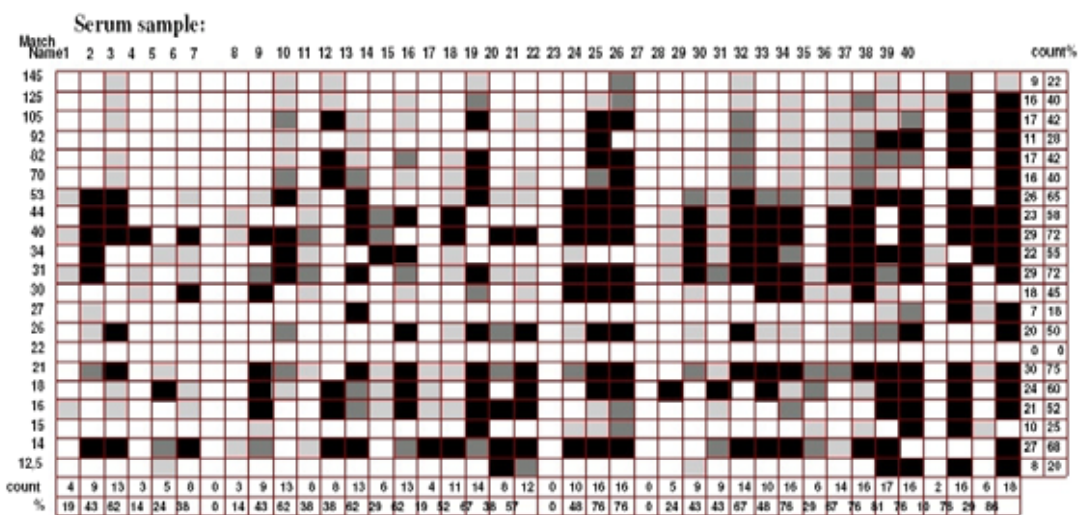


The Facts

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Diversity of IgE specificities

Allergogram, Peanut



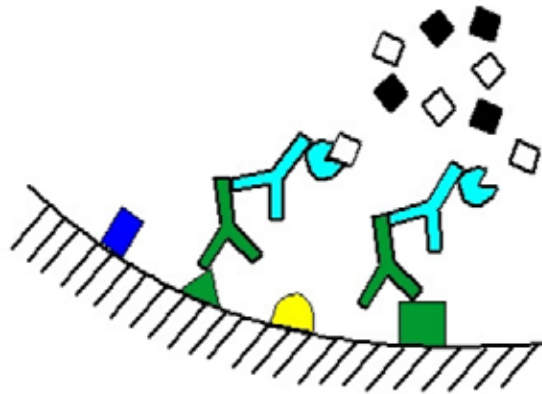
H. Perborn, 1997

The Design

Immunoassay principle

Sequential immunometric assay

- ✓ high sensitivity and specificity
- ✓ high precision
- ✓ wide measuring range

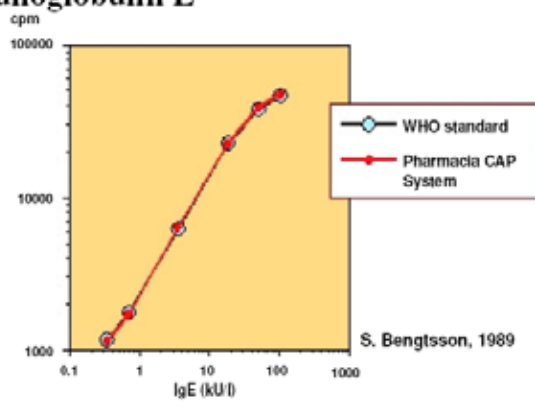


The Design

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Calibration

- ✓ Calibrators: human IgE
- ✓ Anti-IgE ImmunoCAP
- ✓ Calibration to the 2nd International Reference Preparation 75/502 of Human Serum Immunoglobulin E from WHO



WHO IgE Ref. Prep. 75/502 and Pharmacia CAP System calibrator

The Design

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Solid phase: ImmunoCAP Extremely high binding capacity

Comparison of binding capacities



The Allergen Standardization

Basis for allergen source material standardization

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ImmunoCAP
Performance
specification

Source materials
>5 lots

30 patient sera
IgE screening
Immunoblotting

ANALYSIS

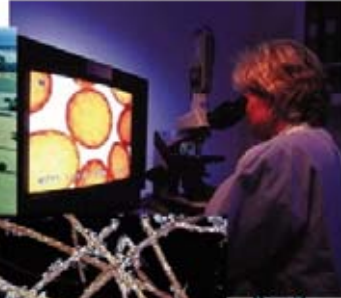
Quality assurance





Quality control criteria
Source material and reference
Selected serum reagents

The Allergen Standardization

Phadia Allergon AB

ImmunoCAP Technology



-  Leading producer of allergen source material
-  Subsidiary of Phadia AB
-  >30 years experience in the field
-  GMP and GLP compliance, ISO 9001 certified

The Allergen Standardization

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The Biobank

at Pharmacia & Upjohn Diagnostics AB

The Biobank

Serum/plasma collection
Characterization



Clinically documented
sera/plasma of great variety



R&D

Allergen standardization



Production

Products
Quality control
Quality assurance programs



The Performance

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Sensitivity and specificity

Clinical evaluation of UniCAP

UniCAP specific IgE

| | Pos | Neg | Total |
|-----------------------------|------|------|-------|
| Allergen specific diagnosis | | | |
| Pos | 1121 | 144 | 1265 |
| Neg | 360 | 3545 | 3905 |
| Total | 1481 | 3689 | 5170 |

Sensitivity: 89%

Specificity: 91%

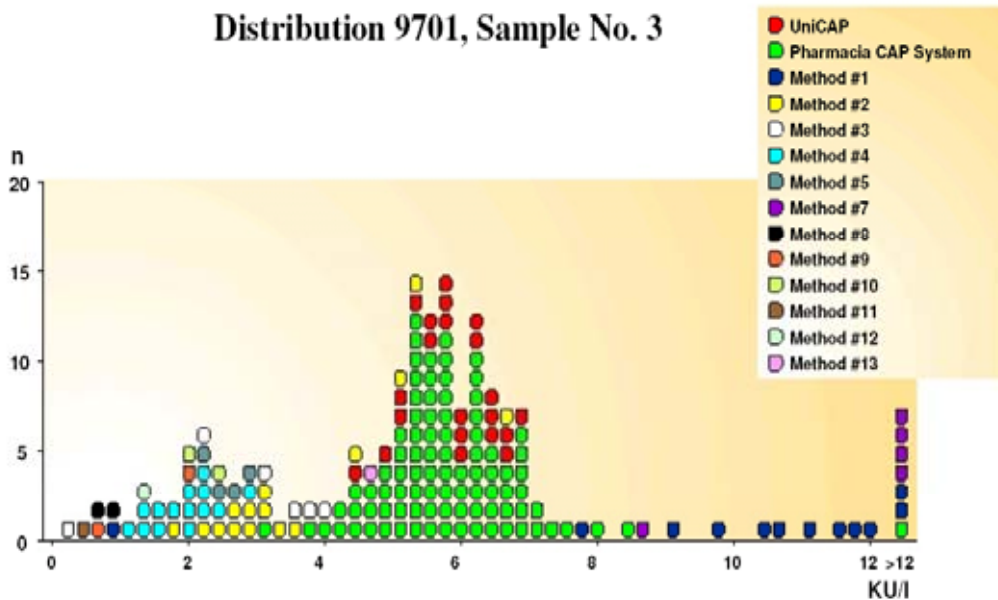
The Performance

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Trueness EuroEQAS

Distribution 9701, Sample No. 3



IC-34

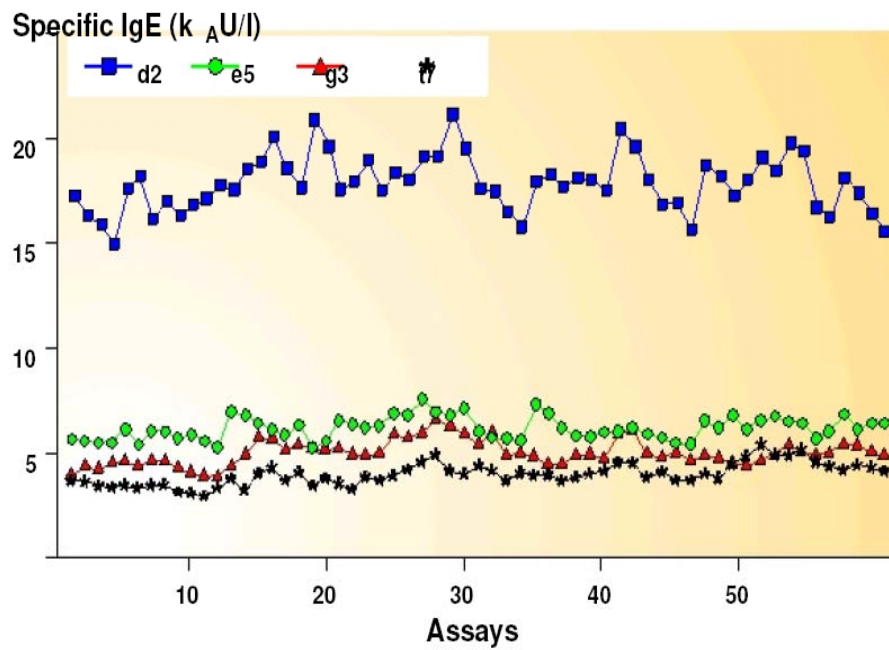
With permission from Dr R. Fifield, Protein Reference Unit, Cardiff, Wales, UK.

The Performance

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Reproducibility

Repeatability of Pharmacia CAP System

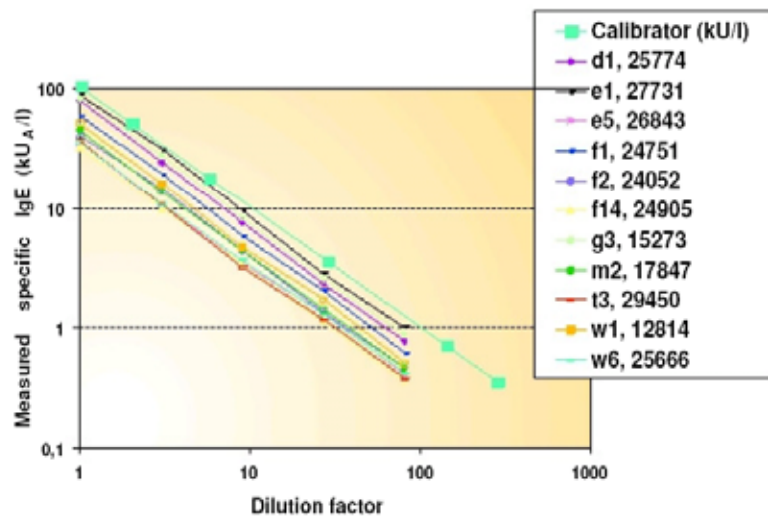


The Performance

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Quantitative





Parallelism - UniCAP



 **ImmunoCAP Technology**




Phadia AB Quality Club



-  **The largest quality assessment program in the world in allergy testing!**
-  *Quality Club Specific IgE has* 
more than 700 members i 30 countries
-  **Available programs:** **Quality Club Specific IgE**
Quality Club Total IgE
Quality Club ECP

**ImmunoCAP Technology****Phadia AB**

The world leader in *in vitro* allergy diagnostics

-  **>4000 laboratories in more than 50 countries use UniCAP/Pharmacia CAP System**
 -  **Close to 1000 employees dedicated to *in vitro* allergy diagnostics**
 -  **ISO 9001 certified and GMP compliant according to FDA requirements**
- 