



高雄醫學大學附設醫院 EBM月會

Determination of multiple allergen-specific IgE by microfluidic immunoassay cartridge

檢驗醫學部

R1 楊豐碩/指導醫師：林宜靜主任...

2013.02.04



第一部份： 情境分析與提出臨床問題



臨床情境 (Clinical Scenario)

- 檢驗醫學部收到小兒科醫師會辦簽呈：
有廠商研發出「百敏析特異性過敏原微流體檢測平台（BioIC Allergen Specific-IgE Detection Kit（microfluidic-based immunoassay microarrays）」。因所需檢體
量僅需血液0.1 cc，適合新生兒及小兒採血困難的病患。且每個檢體只需40分鐘檢測時間。
因此建議引進此種檢驗方法。



所形成的臨床問題

臨床單位的訴求

- 想新增BioIC檢驗
 - 檢體量少，適合小兒科病人
 - 可快速檢驗過敏原

檢驗單位的疑問

- 本院目前用來檢驗過敏原的方法有哪些?
→ImmunoCAP, MAST CLA
- BioIC的檢驗方式是否有足夠的證據支持?
- 若真的要新增此檢驗項目，設備及試劑成本如何?是否有健保給付?





EBM的步驟

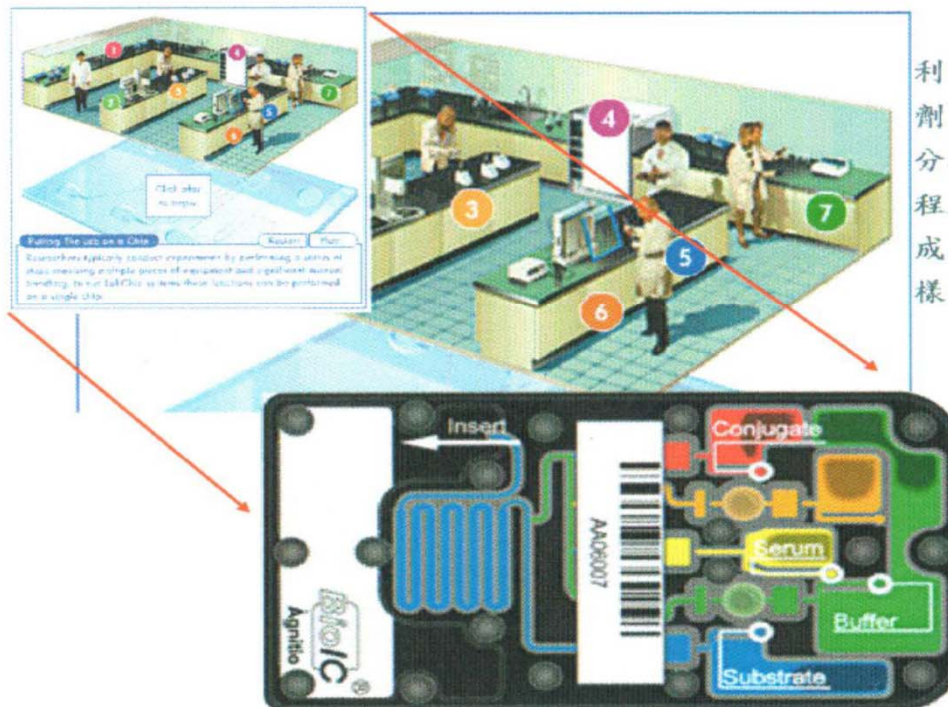
- Asking
 - 將臨床問題寫成PICO
- Acquire
 - 找資料來回答問題
- Appraisal
 - 嚴格評讀文獻
- Apply
 - 是否可應用到病人身上



Background Questions

- BioIC Allergen Specific-IgE Detection Kit (microfluidic-based immunoassay microarrays) 是甚麼?

微流體實驗室晶片



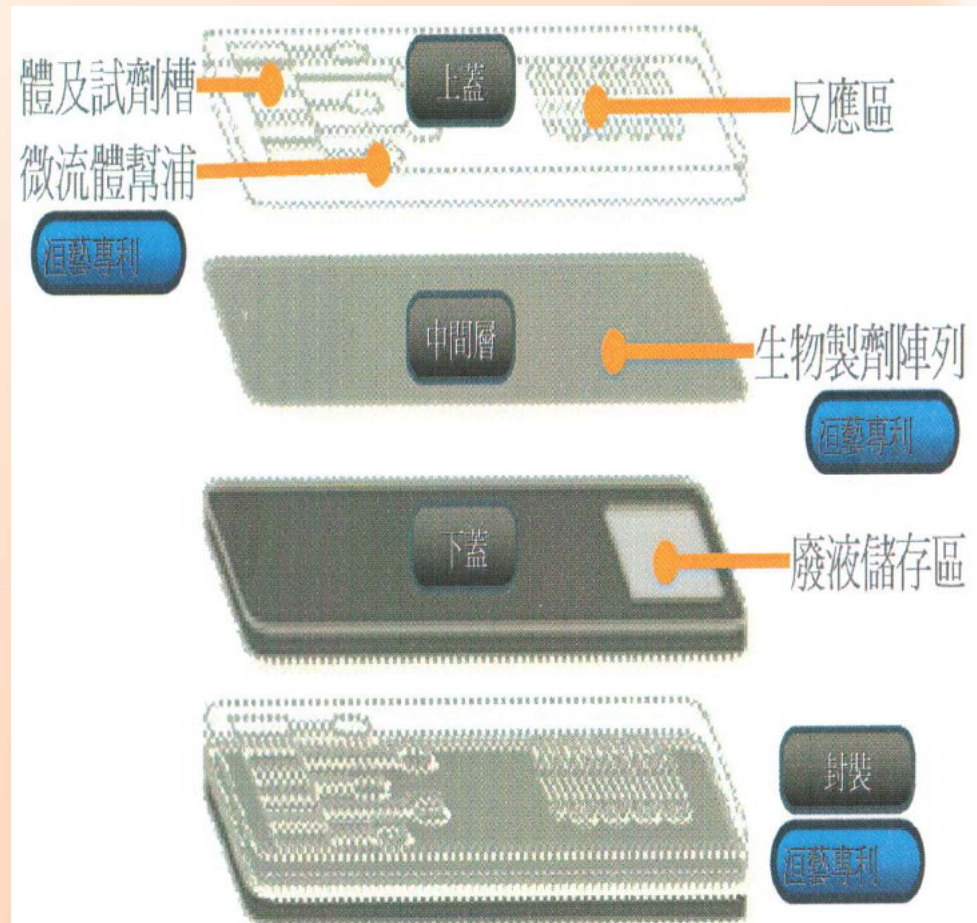
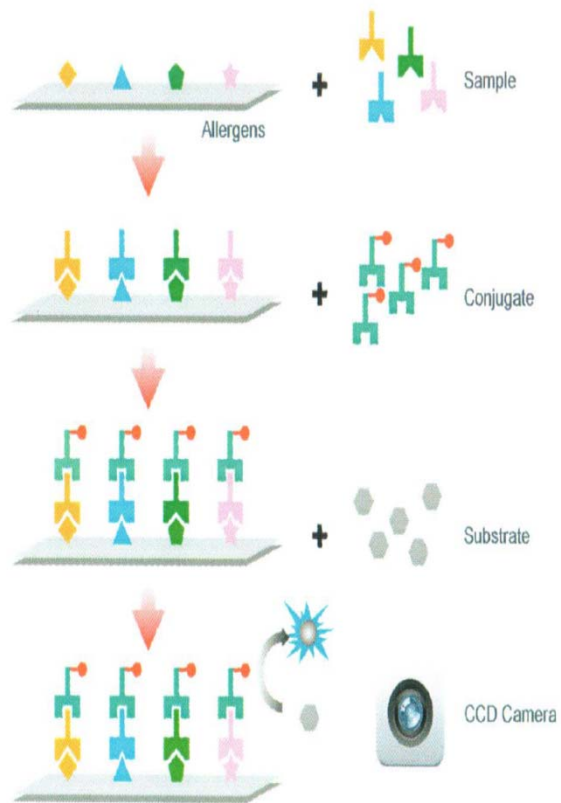
利用微機電系統技術把樣本、試劑、反應偵測(間接酵素免疫冷光分析)及廢液導流等一連貫複雜的程序整合在晶片上,以獲得降低成本、快速得到檢測結果及減少樣品消耗等優點。





Background Questions

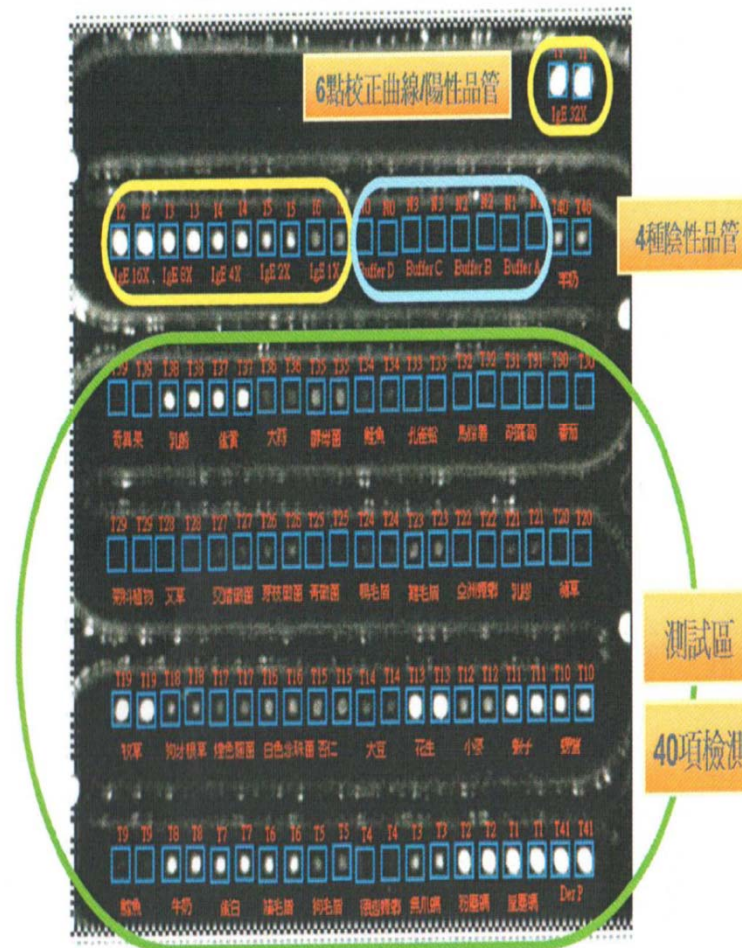
體外特異性過敏原檢測原理





Microarray

BiolC微流體晶片反應影像





過敏原檢測項目 [型號: AD40]



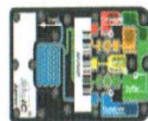
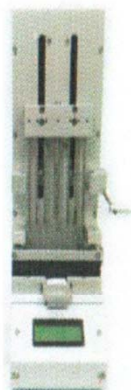
過敏原	編號
青黴菌	M1
芽枝黴菌	M2
煙色麴菌	M3
白色念珠菌	M5
交錯黴菌	M6
狗牙根草	G2
牧草	G6
豬草	W1
艾草	W6
菊科植物	W12
屋塵蟎	D1
粉塵蟎	D2
無爪蟎	D201
狗毛屑	E1
貓毛屑	E5
雞毛屑	E85
鴨毛屑	E86
德國蟑螂	I6
亞洲蟑螂	I207
乳膠	K82

過敏原	編號
蕃茄	F25
胡蘿蔔	F31
馬鈴薯	F35
奇異果	F84
大蒜	F47
花生	F13
大豆	F14
小麥	F4
杏仁	F20
鮭魚	F41
鱈魚	F3
螃蟹	F23
蝦子	F24
孔雀蛤	F37
牛奶	F2
羊奶	F300
乳酪(乾酪型)	F81
蛋白	F1
蛋黃	F75
酵母菌	F45





工作流程安排 - 以檢體量40 tests/day為例



兩套 1對6 分析儀



自動加入所需試劑
 $10 \text{ sec} * 40 = 400 \text{ sec} (\sim 7 \text{ min})$
10 min

加入檢體 $100 \mu\text{L}$
 $20 \text{ sec} * 40 = 800 \text{ sec} (\sim 14 \text{ min})$
20 min

反應+判讀分析 (40片)
~ 2 hrs

2.5小時可發出 40 份報告結果





Foreground Questions

- BioIC Allergen Specific-IgE Detection Kit (microfluidic-based immunoassay microarrays)在過敏原偵測的能力如何?
(BioIC是否比ImmunoCAP或MAST CLA有更高的靈敏度、特異性?)



PICO

P

Patient/Problem

- Pediatric patients suffered from allergic disease.

I

Intervention

- BioIC

C

Comparison

- ImmunoCAP or MAST CLA

O

Outcome

- Sensitivity, specificity of allergen-specific IgE detection



EBM的步驟

- Asking
 - 將病人的問題寫成PICO
- Acquire
 - 找資料來回答問題
- Appraisal
 - 嚴格評讀文獻
- Apply
 - 是否可應用到病人身上



搜尋UpToDate

- 關鍵字：“**Allergy test or Allergen**”



Result 1



Database	UpToDate
Title of article	Overview of in vitro allergy tests
Content	In vitro tests for allergy must be interpreted in the context of the patient's specific clinical history. A positive test for allergen-specific IgE confirms the presence of the antibody only; actual reactivity must be determined by history or supervised challenge.

Result 1



Database	UpToDate
Title of article	Overview of in vitro allergy tests
Content	The sensitivity and specificity of immunoassays vary with the system being used and the quality of the allergen. Overall, sensitivity ranges from 60~95% and specificity from 30~95%. In comparison, skin prick/puncture tests generally have high sensitivity and specificity (>85%) when standardized inhalant extracts with high potency are used.

Result 1



Database	UpToDate
Title of article	Overview of in vitro allergy tests
Content	Immunoassays are commonly used in vitro tests for IgE-mediated allergy. Skin testing is usually preferred to in vitro testing for the diagnosis of allergic disease(?). However, in vitro testing poses no risk to the patient, is not affected by medications, and is convenient. In a few clinical situations, in vitro testing may be superior to skin testing.

Result 1



Database	UpToDate
Title of article	Overview of in vitro allergy tests
Content	Serum levels of total IgE are of limited utility in the diagnosis of allergic diseases. (An ↑ total IgE may indicate that the patient has an atopic condition, → it provides no information about which allergens the patient is sensitive to.)

Result 1



Database	UpToDate
Title of article	Overview of in vitro allergy tests
Content	At least for some foods, that the level of specific IgE as measured by one specific commercial system, Phadia ImmunoCAP®, may be more predictive than skin testing for diagnosing true clinical reactivity upon ingestion. The studies that demonstrated this were performed in children, and generalizability to adults has not yet been confirmed. (無MAST CLA資料) <i>Jeanne Yiching Lin</i> 

Result 2



Database	UpToDate
Title of article	Diagnostic evaluation of food allergy
Content	The elements in the evaluation of food allergy include history, PE, skin testing, in vitro testing, elimination diets, food diaries, and various types of food challenges.

Result 2



Database	UpToDate
Title of article	Diagnostic evaluation of food allergy
Content	A (+) skin test to a particular food only indicates the possibility that the patient has true allergy to that food. The specificity of skin testing for foods varies from 50~95% .

Result 2



Database	UpToDate
Title of article	Diagnostic evaluation of food allergy
Content	A (-) skin test result indicates absence of an IgE-mediated allergy upon subsequent challenge with a 90~95% predictive accuracy.

Result 2



Database	UpToDate
Title of article	Diagnostic evaluation of food allergy
Content	Sensitivity of IgE immunoassays varies among different foods. Immunoassays have demonstrated very high positive predictive accuracy in children for several of the major food allergens . (egg, milk, peanut, tree nuts, and fish : positive predictive accuracy of 95% for a reaction on challenge)

Result 3



Database	UpToDate
Title of article	Future diagnostic tools for food allergy
Content	Research is promising for improved diagnostics for IgE-mediated allergy, using recombinant allergens, IgE-binding epitopes, and microarrays . (無BioIC資料)



Searching Strategy 1 : Finding out The Correct Keywords

“allergen”, “allergy test”,
“microfluidic-based immunoassay”
“ImmunoCAP” , “MAST”



搜尋其他Secondary Database 和Primary Database



電子資源整合系統 x 電子資源整合系統 x Search x

onlinelibrary.wiley.com.ezproxy.lib.kmu.edu.tw:2048/cochranelibrary/search

Google 從 IE 匯入 (1)

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from [The Cochrane Collaboration](#)

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FORGOTTEN PASSWORD ?
INSTITUTIONAL LOGIN >

Search | **Search Manager** | **Medical Terms (MeSH)** | **Browse**

+ Title, Abstract, Keywords allergen
[Search Limits](#) View search tips (Word variations have been searched) [Go](#) [Save](#)
[Add to Search Manager](#)

All Results (3308)

- ☒ Cochrane Reviews (21)
 - ☒ All
 - ☐ Review
 - ☐ Protocol
- ☐ Other Reviews (23)
- ☐ Trials (3246)
- ☐ Methods Studies (1)
- ☐ Technology Assessments (9)
- ☐ Economic Evaluations (8)
- ☐ Cochrane Groups (0)

☒ All
☐ Current Issue

Me Methodology
Dg Diagnostic
 Ov Overview
 Cc Conclusions changed
 Ns New search
 Mc Major change
 Up Update
 Wd Withdrawn
 Cm Comment

Cochrane Database of Systematic Reviews : Issue 12 of 12, December 2012

There are **21** results from **7646** records for your search on 'allergen in title abstract keywords in Cochrane Reviews'

Sort by Relevance

Select all | Export all | Export selected

- ☐ **Mono and multifaceted inhalant and/or food allergen reduction interventions for preventing asthma in children**
Tanja Maas , Janneke Kaper , Aziz Sheikh , J. André Knottnerus , Geertjan Vlasselaer , Edward Dompeling , Jean WM Muris and Constant Paul van Schayck
April 2011
- ☐ **Injection allergen immunotherapy for asthma**
Michael J Abramson , Robert M Puy and John M Weiner
August 2010
- ☐ **Allergen injection immunotherapy for seasonal allergic rhinitis**
Moises A Calderon , Bernadette Alves , Mikila Jacobson , Brian Hurwitz , Aziz Sheikh and Stephen Durham
January 2009 [Review](#)
- ☐ **Pet allergen control measures for allergic asthma in children and adults**
Sally A Kilburn , Toby J Lasserson and Michael C McKean
January 2009 [Ns](#) [Review](#)
- ☐ **Allergen -specific oral immunotherapy for peanut allergy**
Ulugbek Nurmatov , Iris Venderbosch , Graham Devereux , F Estelle R Simons and Aziz Sheikh
September 2012 [Review](#)

**Allergen:
共21篇,
與PICO相關性低**

開始 Windows Media Player Search - Google Chrome 高雄醫學大學圖書... 下午 05:33

電子資源整合系統 x 電子資源整合系統 x Search

onlinelibrary.wiley.com.ezproxy.lib.kmu.edu.tw:2048/cochranelibrary/search

Google 從 IE 匯入 (1)

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from The Cochrane Collaboration

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INSTITUTIONAL LOGIN >

Search Search Manager Medical Terms (MeSH) Browse

+ Title, Abstract, Keywords "allergy testing"
Search Limits View search tips (Word variations have been searched) Go Save
Add to Search Manager

All Results (39)
Cochrane Reviews (0)
All
Review
Protocol
Other Reviews (0)
Trials (36)
Methods Studies (0)
Technology Assessments (3)
Economic Evaluations (0)
Cochrane Groups (0)
All
Current Issue

Me Methodology
Dg Diagnostic
Ov Overview
Cc Conclusions changed
Ns New search
Mc Major change
Up Update
Wd Withdrawn

Cochrane Central Register of Controlled Trials : Issue 12 of 12, December 2012
There are 36 results from 680109 records for your search on "allergy testing" in title abstract keywords in Trials
Pages 1 - 25 | 26 - 36
Sort by Relevance

Select all | Export all | Export selected

- ☒ A pilot study of distraction for adolescents during allergy testing :
Jeffs DA
Journal for specialists in pediatric nursing : JSPN, 2007, 12(3), 170
- ☐ Comparison of two disposable plastic skin test devices with the bifurcated needle for epicutaneous allergy testing :
Corder WT, Hogan MB and Wilson NW
Annals of Allergy, Asthma, & Immunology, 1996, 77(3), 222
- ☐ Randomized, double-masked, placebo-controlled clinical study of the effectiveness of zinc acetate in the treatment of cold symptoms in allergy-tested subjects
Petrus E, Lawson K, Bucci L and Blum K
Current Therapeutic Research, Clinical and Experimental, 1998, 59(9), 595
- ☐ Comparison of Multi-Test II skin prick testing to intradermal dilutional testing.
Simons JP, Rubinstein EN, Kogut VJ, Melfi PJ and Ferguson BJ
Otolaryngology-head and neck surgery : official journal of American Academy of Otolaryngology, Head and Neck Surgery, 2004, 130(5), 536
- ☒ Detection of skin irritation potential of cosmetics by non-invasive measurements.
Zuang V, Rona C, Archer G and Berardesca E
Skin Pharmacology & Applied Skin Physiology, 2000, 13(6), 358
- ☐ Open trial of supplements of omega 3 and 6 fatty acids, vitamins and minerals in atopic dermatitis.
Eriksen BB and Kare DL

Cochrane search 2.htm

顯示所有下載...

開始 Windows Media Player Search - Google Chrome 高雄醫學大學圖書... Cochrane Reviews - ... 下午 05:40

Allergy testing:
共36篇,
與PICO相關性低

Microfluidic-based
immunoassay : 0篇
BioIC: 0篇

PubMed文獻搜尋過程與結果

關 鍵 字	篇 數
#1 ImmunoCAP (Human)	278
#2 MAST (Human)	19594
#3 microfluidic-based immunoassay or BioIC (Human)	7
#4 microfluidic-based immunoassay or BioIC	18

關鍵字與搜尋過程

History

[Clear](#)

Search	Add to builder	Query	Items found
#11	Add	Search (#8 AND #5) Schema: all	0
#10	Add	Search (#8 AND #5)	0
#9	Add	Search (#8 AND #4)	1
#8	Add	Search microfluidic-based immunoassay or BiolC	18
#7	Add	Search microfluidic-based immunoassay or BiolC Filters: Humans	7
#6	Add	Search microfluidic-based immunoassay Filters: Humans	7
#5	Add	Search MAST Filters: Humans	19594
#4	Add	Search ImmunoCAP Filters: Humans	278
#3	Add	Search allergen screening Filters: Humans	12769
#2	Add	Search allergen screening	15129
#1	Add	Search microfluidic-based immunoassay AND allergen	3

搜尋到的論文

- Title:

Determination of multiple allergen-specific IgE by microfluidic immunoassay cartridge in clinical settings.

- Journal:

Pediatr Allergy Immunol 2010; 21: 623–633



研究方法

- Patient: 3~18 y/o, evaluated in MacKay and NCKU Hospital
- The patient history and PE, SPTs, and blood tests for allergen specific IgE levels were performed as part of standard clinical care.



研究方法

- **Exclusion criteria:** currently undergoing allergen **immunotherapy**, or had taken oral **antihistamines** within 5 days before performing SPT, with any other **systemic** diseases that were not suitable to be enrolled in the study.



研究方法

- The sample size was determined to be 200 evaluable subjects to ensure recruiting at least 40 positive subjects and 40 negative subjects for each of the **9 target allergens.**
- Allergy and related medical history of each study subjects were evaluated by allergic specialists (S.D.S. and J.Y.W.).

研究方法

- 213 subjects who met all eligible requirements with **at least one positive** result of **SPT** for entry into the study were enrolled into this study for bio-sample collection and **212** of them were considered evaluable.

研究方法

- Sera were aliquoted into 2 samples and stored at 4C. To prevent any bias between the assay procedures, the BioIC and ImmunoCAP100 testing were analyzed **blindly** and periodically on the same day by a licensed clinical laboratory.



研究方法

- **Random numbers** instead of real subject identification were assigned to the vials.



研究方法

- All targets were present in **quadruplicate**. Target intensities were calculated by removing the spot farthest from the mean, averaging the remaining three spots, and subtracting the negative control intensity.



EBM的步驟

- Asking
 - 將病人的問題寫成PICO
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要評讀的論文

- Title:

Determination of multiple allergen-specific IgE by microfluidic immunoassay cartridge in clinical settings.

- Journal:

Pediatr Allergy Immunol 2010; 21: 623–633



Was the diagnostic test evaluated in a Representative spectrum of patients (評估族群是否具代表性)?

☒ 是

☐ 否

☐ 不清楚

評論：

Children and adolescents from 3 to 18 yr of age who were evaluated at the pediatric allergy and immunology clinics in MacKay Memorial Hospital, Taipei, and National Cheng Kung University Hospital, Tainan, Taiwan. (在2個台灣的醫學中心共收錄212個小兒科病人)

受試者過敏性疾病比例

Table 1. Number of subjects with allergic disease history – evaluable population

Allergic symptoms	BiolC [®] tested (n = 212)
Allergic rhinitis	90.6 (192)
Atopic eczema	73.1 (155)
Asthma	52.8 (112)
Urticaria	5.2 (11)
Allergic conjunctivitis	4.7 (10)

Values are expressed as % (n).

mean age: 8.1 ± 3.9 y/o,
♂ : 120 (56.6%), ♀ : 92 (43.4%)

Was the reference standard ascertained regardless of the index test result? (標準診斷工具做確診時不知道指標診斷工具的結果?)

☒ 是

☐ 否

☐ 不清楚

評論：

- ◆ 標準診斷工具：SPT + History + PE
- ◆ 指標診斷工具：BioIC and ImmunoCAP

Was there an independent, blind comparison between the index test and an appropriate reference ('gold') standard of diagnosis?

☒ 是

☐ 否

☐ 不清楚

評論：

No randomization.

'Gold' standard: SPT + clinical context

Blind: BioIC and ImmunoCAP100 testing were analyzed **blindly** and periodically on the same day by a licensed clinical laboratory.



Were the methods for performing the test described in sufficient detail to permit replication?

☒ 是

☐ 否

☐ 不清楚

評論：

◆ The article have sufficient description of the test to allow its replication and also interpretation of the results.

選擇的文獻有效回答所問的問題？

☒ 是（部分）

☐ 否

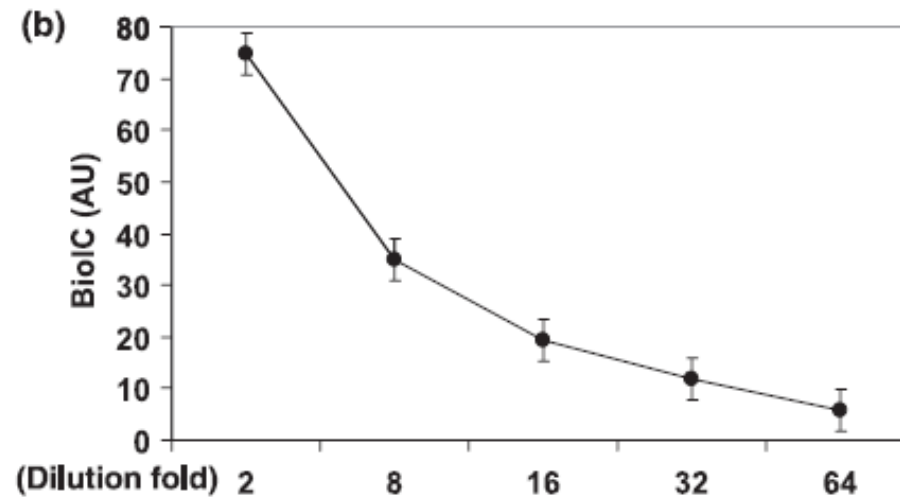
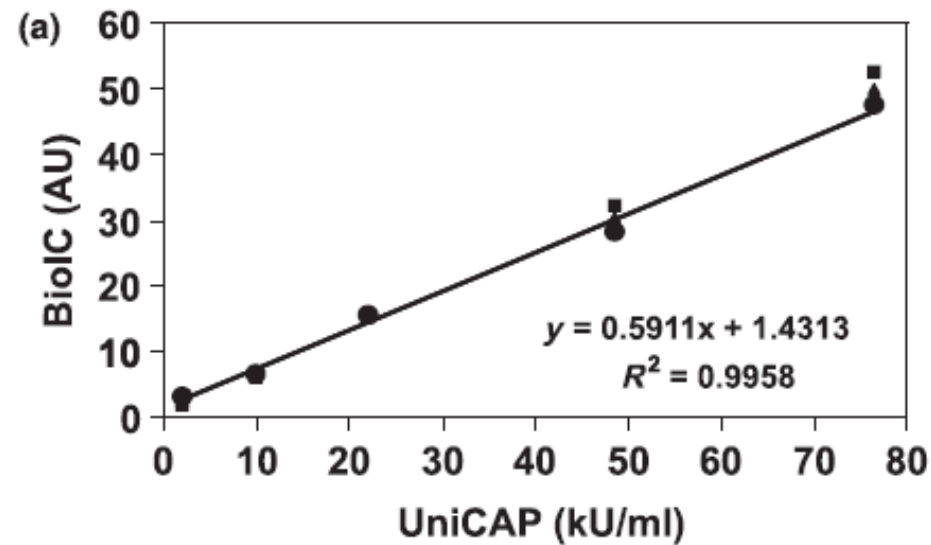
☐ 不清楚

評論：

◆.見後面表格



BioIC 與CAP對照



受試者對9種過敏原呈陽性比例(三種檢驗方法)

Table 2. The number and percentage of subjects with positive results of skin prick test (SPT), BioIC, and ImmunoCAP in evaluable population

Allergens	SPT n = 212	BioIC® n = 212	ImmunoCAP® n = 212
Overall	212 (100.0)	200 (94.3)	168 (79.2)
<i>D. pteronyssinus</i> (D1)	170 (80.2)	171 (80.7)	153 (72.2)
<i>D. farinae</i> (D2)	132 (62.3)	158 (74.5)	147 (69.3)
<i>Blomia tropicalis</i> (D201)	N/A	159 (75.0)	116 (54.7)
German cockroach (I6)	71 (33.5)	36 (17.0)	31 (14.6)
Dog dander (E5)	88 (41.5)	88 (41.5)†	24 (11.3)†
Cat dander (E1)*	103 (48.6)‡§	8 (3.8)‡	9 (4.2)§
Egg white (F1)	42 (19.8)	55 (25.9)†	29 (13.7)†
Milk (F2)	41 (19.3)	42 (19.8)	27 (12.7)
Codfish (F3)*	53 (25.0)‡§	5 (2.4)‡	2 (0.9)§

Values are expressed as n (%).

*p < 0.05, anova test among SPT, BioIC, and ImmunoCAP.

†p < 0.05, Student's *t*-test between BioIC and ImmunoCAP.

‡p < 0.05, Student's *t*-test between SPT and BioIC.

§p < 0.05, Student's *t*-test between SPT and ImmunoCAP.



三種檢驗方法的一致性(互相比較)

Table 3. Percentage (95% CI) of agreement between two tests among BioIC[®], ImmunoCap[®], and skin prick test (SPT)

Allergen	BioIC [®] and SPT	ImmunoCAP [®] and SPT	BioIC [®] and ImmunoCAP [®]
<i>D. pteronyssinus</i> (D1)	69.3 (62.6–75.5)	72.2 (65.6–78.1)	73.6 (67.1–79.4)
<i>D. farinae</i> (D2)	65.1 (58.2–71.5)	67.5 (60.6–73.8)	78.8 (72.6–84.1)
German cockroach (I6)	64.6 (57.7–71.1)	66.0 (59.2–72.4)	75.0 (68.6–80.7)
Dog dander (E5)	52.8 (45.8–59.8)	56.6 (49.6–63.4)	<u>58.5 (51.5–65.2)</u>
Cat dander (E1)	<u>51.4 (44.4–58.4)</u>	<u>50.9 (44.0–57.9)</u>	93.9 (89.7–96.7)
Egg white (F1)	70.3 (63.6–76.4)	75.0 (68.6–80.7)	72.6 (66.1–78.6)
Milk (F2)	71.2 (64.6–77.3)	<u>76.4 (70.1–82.0)</u>	73.1 (66.6–79.0)
Codfish (F3)	<u>74.5 (68.1–80.3)</u>	75.0 (68.6–80.7)	<u>96.7 (93.3–98.7)</u>
Overall	64.9 (58.2–71.5)	67.5 (60.6–73.8)	77.8 (71.6–83.3)

敏感度與特異性 (詳見下頁)

Table 4. Sensitivity and specificity of BiolC and ImmunoCAP compared to skin prick tests

Allergens	BiolC® (n = 212)		ImmunoCAP® (n = 212)	
	Sensitivity	Specificity	Sensitivity	Specificity
<i>D. pteronyssinus</i> (D1)	81.2 (138/170)	21.4 (9/42)	77.6 (132/170)	50.0 (21/42)
<i>D. farinae</i> (D2)	81.8 (108/132)	37.5 (30/80)	79.5 (105/132)	47.5 (38/80)
German cockroach (I6)	22.5 (16/71)	85.8 (121/141)	21.1 (15/71)	88.7 (125/141)
Dog dander (E5)*	43.2 (38/88)	59.7 (74/124)	11.4 (10/88)	88.7 (110/124)
Cat dander (E1)	3.9 (4/103)	96.3 (105/109)	3.9 (4/103)	95.4 (104/109)
Egg white (F1)	40.5 (17/42)	77.6 (132/170)	21.4 (9/42)	88.2 (150/170)
Milk (F2)	26.8 (11/41)	81.9 (140/171)	22.0 (9/41)	89.5 (153/171)
Codfish (F3)	3.8 (2/53)	98.1 (156/159)	1.9 (1/53)	99.4 (158/159)

Values are expressed as % (n).

*p = 0.012.



Test characteristics 診斷工具的特性

- Sensitivity (敏感度):
 - 有病者檢驗呈陽性的機率
- Specificity (特異性):
 - 無病者檢驗呈陰性的機率
- Positive likelihood ratio (陽性相似比):
 - 有病者/無病者 檢驗呈陽性的比率 $LR+ = \text{sens}/(1-\text{spec})$
- Negative likelihood ratio (陰性相似比):
 - 有病者/無病者 檢驗呈陰性的比率 $LR- = (1-\text{sens})/\text{spec}$

	BioIC				ImmunoCAP			
	Sen	Spe	PLR	NLR	Sen	Spe	PLR	NLR
D. pteronyssinus (D1屋塵蟎)	81.2	21.4	1.03	0.88	77.7	50.0	1.55	0.45
D. farinae (D2粉塵蟎)	81.8	37.5	1.3	0.49	79.5	47.5	1.51	0.43
German cockroach (I6)	22.5	85.8	1.58	0.9	21.1	88.7	1.97	0.89
Dog dander (E5)*	43.2	59.7	1.07	0.95	11.4	88.7	1.01	0.99

Positive likelihood ratio: (≥ 4 is valuable)

Negative likelihood ratio: (≤ 0.6 is useful)



	BioIC				ImmunoCAP			
	Sen	Spe	PLR	NLR	Sen	Spe	PLR	NLR
Cat dander (E1)	3.9	96.3	1.05	0.99	3.9	95.4	0.85	1.01
Egg white (F1)	40.5	77.6	1.81	0.77	21.4	88.2	1.81	0.89
Milk (F2)	26.8	81.9	1.48	0.89	22	89.5	2.05	0.87
Codfish (F3)	3.8	98.1	2	0.98	1.9	99.4	3.17	0.92

Conclusions

The total and within one-class **agreements** of each allergen test result between **BioIC** and **ImmunoCAP** ranged between **55.2% and 99.5%** with an overall average of 80.9%.



Conclusions

Laboratory testing for sIgE can be performed on a fully automated, microfluidic cartridge system with advantages of low sample volume, simultaneously tested allergens, and with **diagnostic accuracy** for representative allergens **equivalent to** the semi-automated **CAP** technology.



EBM的步驟

- Asking
 - 將病人的問題寫成PICO
- Acquire
 - 找資料來回答問題
- Appraisal
 - 嚴格評讀文獻
- Apply
 - 是否可應用到病人身上



第四部分：

臨床應用與醫療品質提升

- 一、結合實證醫學的結果、臨床專業經驗給予病人建議
- 二、結合病人價值，幫助病人做出最後的決定



臨床應用

CAP、MAST、BioIC可用於篩檢過敏原。

經查證三種檢驗方式的價格和特性如下表
(健保給付皆為1620點)



項 目	CAP	MAST	BioIC
試劑價格	729.5	835	800+?
總成本	1061	1192	800+?
檢體量	0.35 mL	0.8 mL	0.1 mL
檢驗時間	250test/hr	40test/6hr	40test/2.5hr

(報告時效：CAP：7天 MAST：5天)



但廠商沒有說清楚，上述研究 也沒做到的部分...

第 1 頁，共 4 頁

百敏析特異性過敏原檢測套組

BioIC Allergen Specific-IgE Detection Kit

發行日期 2012/03/01 版本 8.0_ADCHT

衛署醫器製字 002717 號

本產品限醫師及醫檢師經訓練後使用

僅供體外診斷使用 For In Vitro Diagnostic Use

一、效能 Intended Use

百敏析特異性過敏原檢測套組搭配洄藝光度量測化學分析儀 (Agnitio BioIC Analyzer)，用於檢驗人類血清中對過敏原特異性 E 型免疫球蛋白 (Specific IgE) 的體外定量分級試驗。

二、產品簡介 Summary of Product

百敏析特異性過敏原檢測套組結合自動化微流體技術、冷光分析技術與平行化 IgE 分析技術。分析套組中的百敏析分析卡上包含用於血清檢體與試劑的注入孔、儲存槽、微流體通道、S 型管道反應區及廢液儲存槽。高感度的過敏原固定於反應區，用以和檢體中的蛋白質進行特異性結合反應，可同時平行處理多種過敏原篩檢。分析卡需搭配與個人電腦連接的洄藝光度量測化學分析儀，以 LabIT 程式執行分析卡檢驗功能的每個步驟，信號的擷取分析與檢驗結果的存取。

六、檢驗項目 Items of Detection (Allergen Markers)

百敏析特異性過敏原檢測套組

101. 6. 14

型號(Panel): AD40 可提供下列過敏原檢驗項目

項目	過敏原	代碼
1	屋塵蟎 Mite, Dermatophagoides pteronyssinus	D1
2	粉塵蟎 Mite, Dermatophagoides farinac	D2
3*	無爪蟎 Mite, Blomia tropicalis	D201
4	德國蟑螂 Cockroach, German	I6
5	貓毛 Cat Dander	E1
6	狗毛 Dog Dander	E5
7	蛋白 Egg White, Chicken	F1
8	牛奶 Milk, Bovine	F2
9	鱈魚 Codfish	F3
10*	小麥 Wheat	F4
11*	花生 Peanut	F13
12*	大豆 Soybean	F14
13*	杏仁 Almond	F20
14*	蟹 Crab	F23



魔鬼藏在細節裡??

37*	乳酪〈乾酪型〉 Cheddar Cheese	F81
38*	奇異果 Kiwi	F84
39*	羊奶 Milk, Goat	F300
40*	乳膠 Latex	K82



*僅供醫師研究參考



第五部分： 用去學術化術語與病人溝通



去醫療化的建議

微流體特異性過敏原檢測平台
(BioIC)目前仍無大型研究證實
其偵測過敏原的效果。目前所
發表之報告僅包含廠商宣稱可偵
測40種過敏原中的9種，其中部
分項目檢驗效果不佳。因此建議
等有充分證據後再行引進此檢驗。





謝謝聆聽，
敬請指教！





Comparison study between MAST CLA and OPTIGEN

- American Journal of Rhinology & Allergy
- July–August 2011, Vol. 25, No. 4 p e156-157

Table 2 Comparison between the MAST-CLA and OPTIGEN tests to the skin-prick test

Allergen	Group 1, MAST-CLA vs Skin-Prick Test (251 patients)			Group 2, OPTIGEN vs Skin-Prick Test (319 patients)			Comparison of Correlation
	No. (%) of Positivity		Correlation Coefficient	No. (%) of Positivity		Correlation Coefficient	
	MAST-CLA	Skin-Prick Test		OPTIGEN	Skin-Prick Test		
<i>Dermatophagoides farinae</i>	170 (67.7)	128 (51.0)	0.699	136 (42.6)	144 (45.1)	0.787	<i>p</i> <0.05
<i>Dermatophagoides pteronyssinus</i>	177 (70.5)	121 (48.2)	0.695	142 (44.5)	138 (43.3)	0.797	<i>p</i> <0.01
Dog	80 (31.9)	28 (11.2)	0.206	30 (9.4)	57 (17.9)	0.371	<i>p</i> <0.05
Cat	84 (33.5)	38 (15.1)	0.235	26 (8.2)	53 (16.6)	0.549	<i>p</i> <0.001
Mugwort	35 (13.9)	33 (13.1)	0.544	35 (11.0)	39 (12.2)	0.420	<i>p</i> =0.06
Birch pollen	60 (23.9)	27 (10.8)	0.423	23 (7.2)	41 (12.9)	0.240	<i>p</i> <0.05
<i>Alternaria</i>	45 (17.9)	14 (5.6)	0.083	2 (0.6)	22 (6.9)	0.301	<i>p</i> <0.01
<i>Aspergillus</i>	56 (22.3)	7 (2.8)	−0.037	1 (0.3)	12 (3.8)	−0.011	<i>p</i> =0.76





Table 4 Comparison between the MAST-CLA and OPTIGEN tests to CAP

Allergen	Group 3, MAST-CLA vs CAP (104 patients)			Group 4, OPTIGEN vs CAP (270 patients)			Comparison of Correlation
	Number (%) of Positivity		Correlation Coefficient	Number (%) of Positivity		Correlation Coefficient	
	MAST-CLA	CAP		OPTIGEN	CAP		
<i>Dermatophagoides farinae</i>	75 (72.1)	40 (38.5)	0.784	87 (32.2)	97 (35.9)	0.938	$p<0.001$
<i>Dermatophagoides pteronyssinus</i>	78 (75.0)	45 (43.3)	0.837	95 (35.2)	106 (39.3)	0.939	$p<0.001$
Dog	59 (56.7)	4 (3.8)	0.170	19 (7.0)	23 (8.5)	0.716	$p<0.001$
Cat	61 (58.7)	7 (6.7)	0.402	15 (5.6)	13 (4.8)	0.864	$p<0.001$
Cockroach	37 (35.6)	20 (19.2)	0.421	12 (4.4)	29 (10.7)	0.453	$p=0.735$
Mugwort	9 (8.7)	7 (6.7)	0.063	21 (7.8)	21 (7.8)	0.757	$p<0.001$

Result 2



Database	UpToDate
Title of article	Diagnostic evaluation of food allergy
Content	Skin testing for food-specific IgE is used only in the diagnosis of IgE-mediated food allergies . Skin testing is more sensitive than <i>in vitro</i> testing in many cases.

Critical Appraisal

文獻評讀

- **V**alidity
 - 研究方法評析以判斷結果之可信與否
- **I**mportance
 - 結果差異的重要性及對臨床的意義
- **P**rac ticability
 - 可否用來照顧我的病人

對大量醫學相關訊息的真實性和可用性進行去偽存真，擷取精華的步驟



不同類型臨床問題之最佳研究

Question type (問題類型)	Study design (研究設計)
Diagnostic test 診斷性檢驗或檢查	Prospective, blinded cross-sectional study comparing with gold standard 前瞻性、盲法、與黃金標準進行比較之斷面研究
Prognosis 預後	Cohort study > Case control study > Case series study 世代研究 > 病例對照研究 > 病例系列研究
Etiology 病因	Cohort study > Case control study > Case series study 世代研究 > 病例對照研究 > 病例系列研究
Therapy 治療	Randomised control trial (RCT) 隨機對照試驗
Prevention 預防	Randomised control trial (RCT) 隨機對照試驗
Cost effectiveness 成本效益	Economic analysis 經濟分析

- Allergen screening results showed 84% agreement for 3 house dust mites (N = 300) compared with a commercial test and 80% agreement overall (N = 978).



- Average coefficients of variation (N = 80) were measured as 20.5% for low/medium levels and 20.4% for medium/high levels. The average limit of detection (N = 160) was measured at 0.535 AU, and cutoff levels of 1.0 AU were estimated at less than 1 IU/ml (2.4 ng/ml).



- Such a system has potential applications in decentralized allergen screening as well as in other near-patient diagnostic immunoassays where multiplexed analysis, ease of use, and short analysis time are critical.

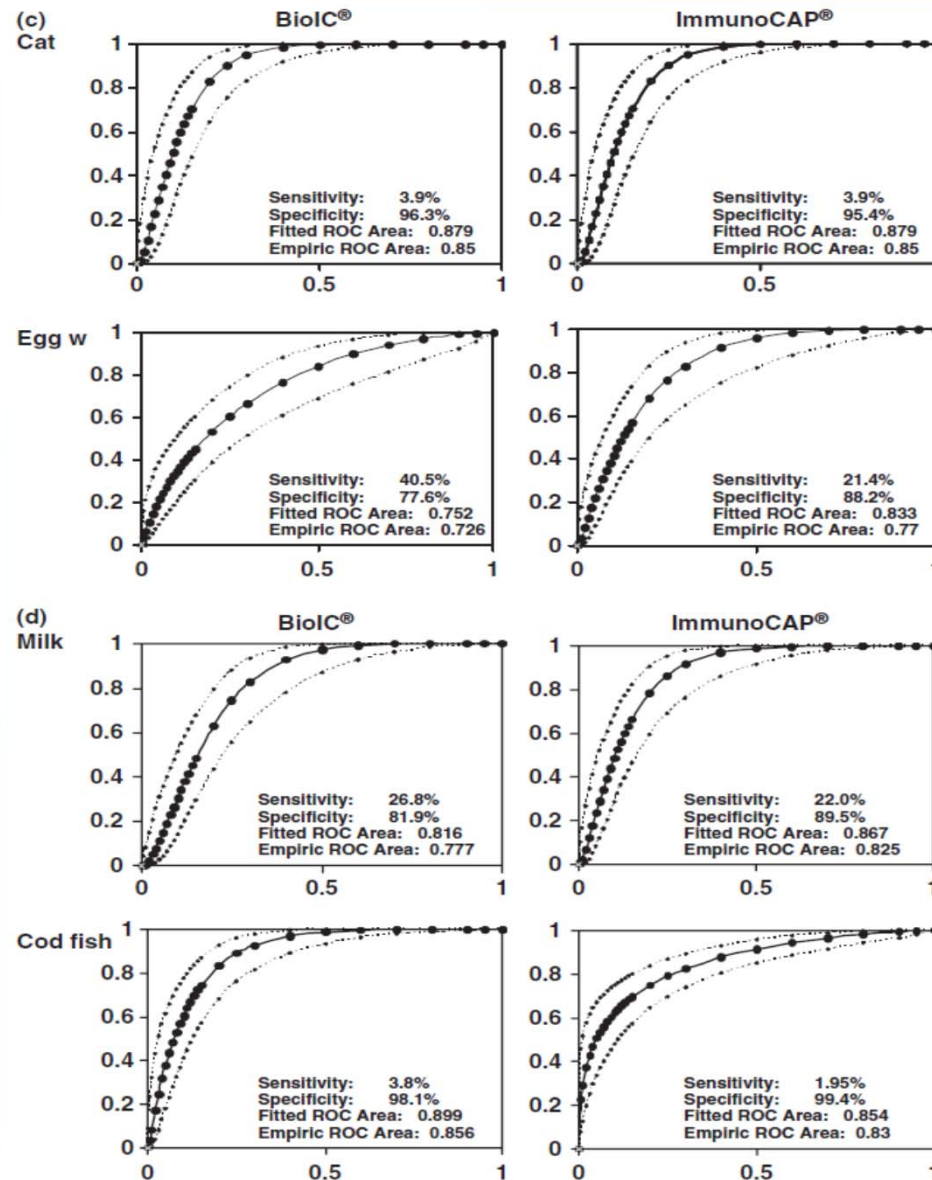




Table 5. Agreement between classes of BiolC® and ImmunoCAP®

		BiolC®									
Class		0	1	2	3	4	5	6	Total	Total agreement (%)	One-class agreement (%)
<i>D. pteronyssinus</i> (D1)											
ImmunoCAP®	0	22	21	14	2	0	0	0	59	73.6	60.8
	1	4	4	0	0	0	0	0	8		
	2	10	5	6	1	0	0	0	22		
	3	3	10	12	4	0	1	0	30		
	4	2	5	12	11	2	1	0	33		
	5	0	0	3	11	16	2	0	32		
	6	0	0	0	3	7	11	7	28		
Total	41	45	47	32	25	15	7	212			
<i>D. farinae</i> (D2)											
ImmunoCAP®	0	37	16	10	2	0	0	0	65	78.8	55.2
	1	2	4	1	0	0	0	0	7		
	2	6	7	6	1	0	0	0	20		
	3	8	10	6	4	1	1	1	31		
	4	1	7	18	10	1	0	1	38		
	5	0	0	9	9	7	1	1	27		
	6	0	0	1	5	6	5	1	24		
Total	54	44	51	31	15	7	10	212			
<i>Blomia tropicalis</i> (D201)											
ImmunoCAP®	0	28	36	23	7	1	1	0	96	56.1	63.7
	1	11	5	2	2	0	0	0	20		
	2	9	11	8	1	0	0	1	30		
	3	4	10	15	5	1	0	1	36		
	4	1	1	5	6	3	0	5	21		
	5	0	0	1	3	1	0	0	5		
	6	0	0	1	1	0	0	2	4		
Total	53	63	55	25	6	1	9	212			
German cockroach (I6)											
ImmunoCAP®	0	152	15	12	2	0	0	0	181	75.0	89.6
	1	16	1	0	0	0	0	0	17		
	2	8	1	1	2	0	0	0	12		
	3	0	0	2	0	0	0	0	2		
	4	0	0	0	0	0	0	0	0		
	5	0	0	0	0	0	0	0	0		
	6	0	0	0	0	0	0	0	0		
Total	176	17	15	4	0	0	0	212			
Dog dander (E5)											
ImmunoCAP®	0	112	57	18	1	0	0	0	188	58.5	90.1
	1	10	3	2	0	0	0	0	15		
	2	2	4	2	0	0	0	0	8		
	3	0	0	0	0	0	0	0	0		
	4	0	0	0	0	0	0	1	1		
	5	0	0	0	0	0	0	0	0		
	6	0	0	0	0	0	0	0	0		
Total	124	64	22	2	0	0	0	212			
Cat dander (E1)											
ImmunoCAP®	0	197	5	1	0	0	0	0	203	93.9	97.6
	1	4	0	0	0	0	0	0	4		
	2	3	0	0	0	0	0	0	3		
	3	0	1	0	1	0	0	0	2		
	4	0	0	0	0	0	0	0	0		
	5	0	0	0	0	0	0	0	0		
	6	0	0	0	0	0	0	0	0		
Total	204	6	1	1	0	0	0	212			
Egg white (F1)											
ImmunoCAP®	0	141	15	20	3	4	0	0	183	72.6	83.0
	1	9	1	3	1	0	0	0	14		
	2	7	5	2	0	0	0	0	14		
	3	0	1	0	0	0	0	0	1		
	4	0	0	0	0	0	0	0	0		
	5	0	0	0	0	0	0	0	0		
	6	0	0	0	0	0	0	0	0		

不同類型臨床問題之最佳研究

Question type (問題類型)	Study design (研究設計)
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