



Healthcare within reach

~ PCT ~

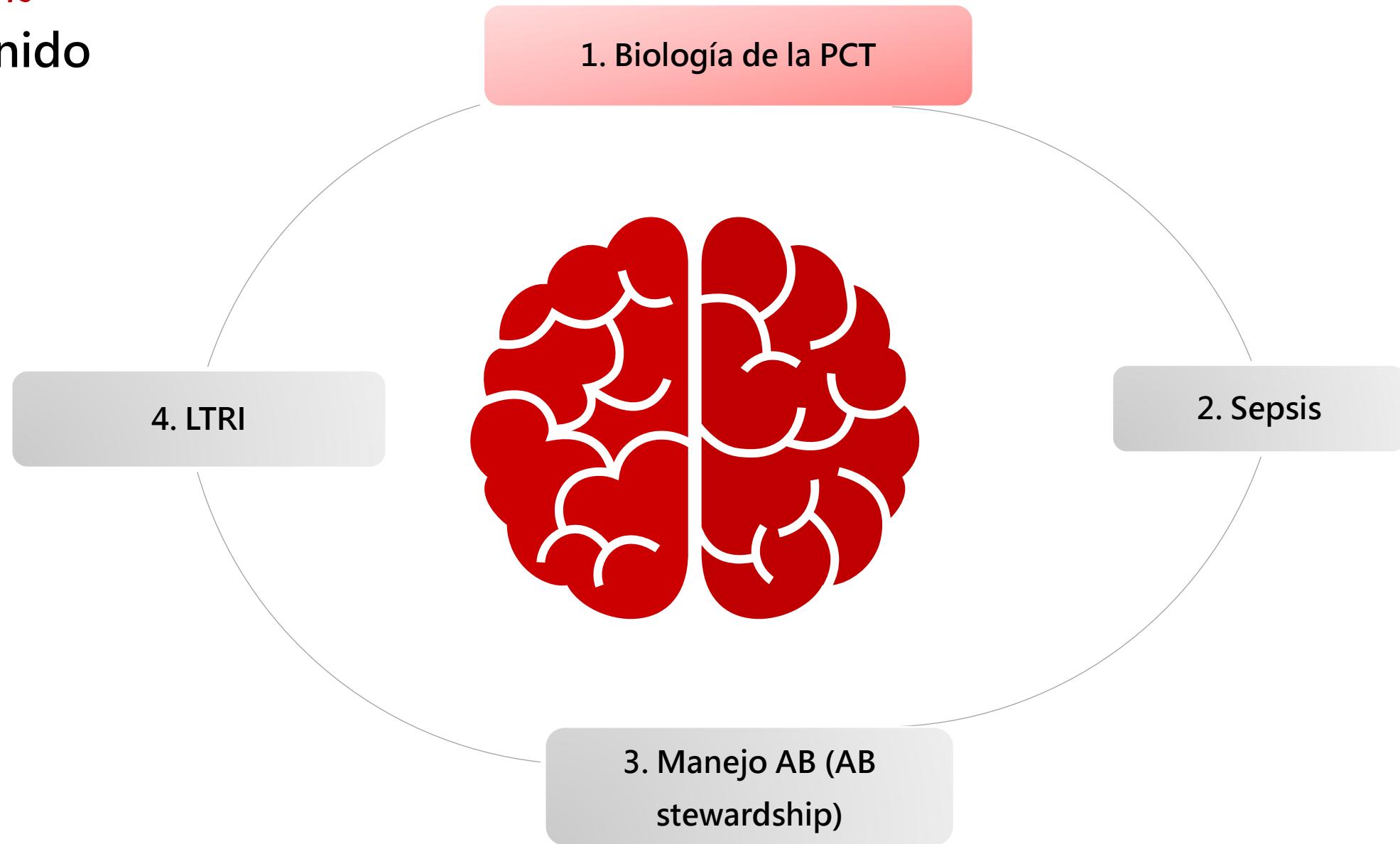
Procalcitonina

Razones de Uso

Camilo Moreno Pinzón
Clinical Manager Immunology LatAm



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Contenido



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1. Biología

Tissue	(pro)Calcitonin mRNA expression in healthy individuals
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Thyroid
White Blood Cells
Perit. Makrophage

Spleen
Lung
Liver
Kidney
Adrenal

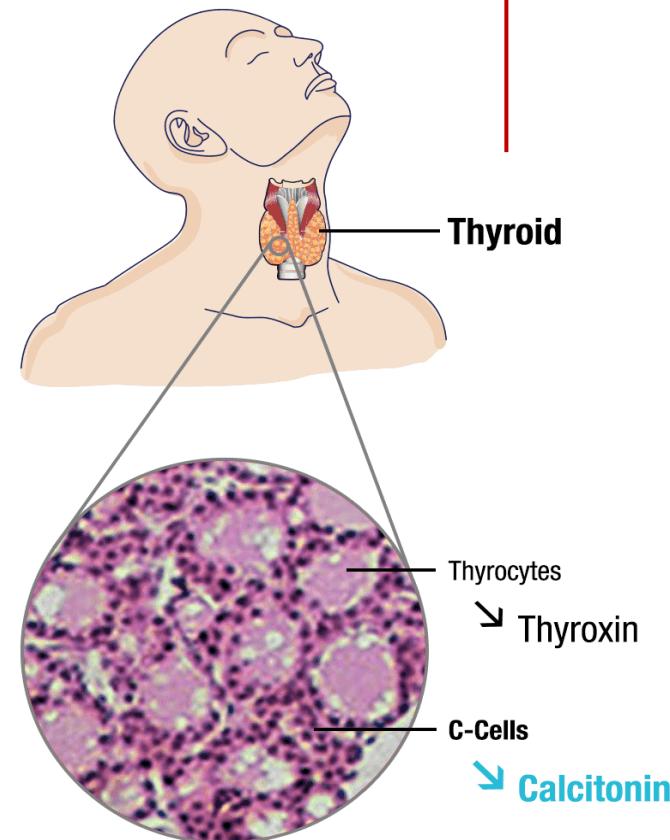
Brain
Spine

Pancreas
Stomach
Small intestine

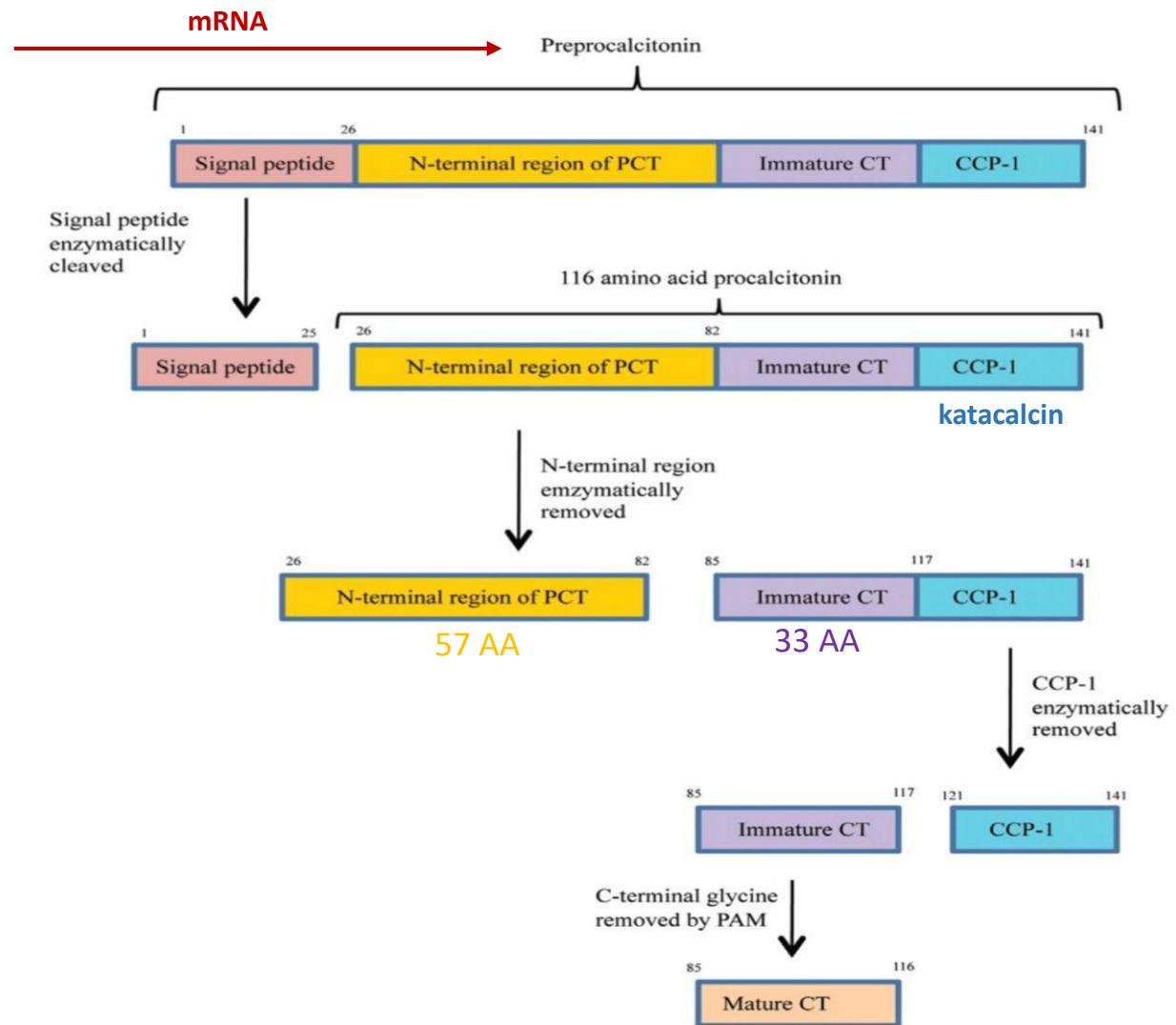
Colon

Heart
Muscle

Skin
Visceral Fat
Testes



CALC-1



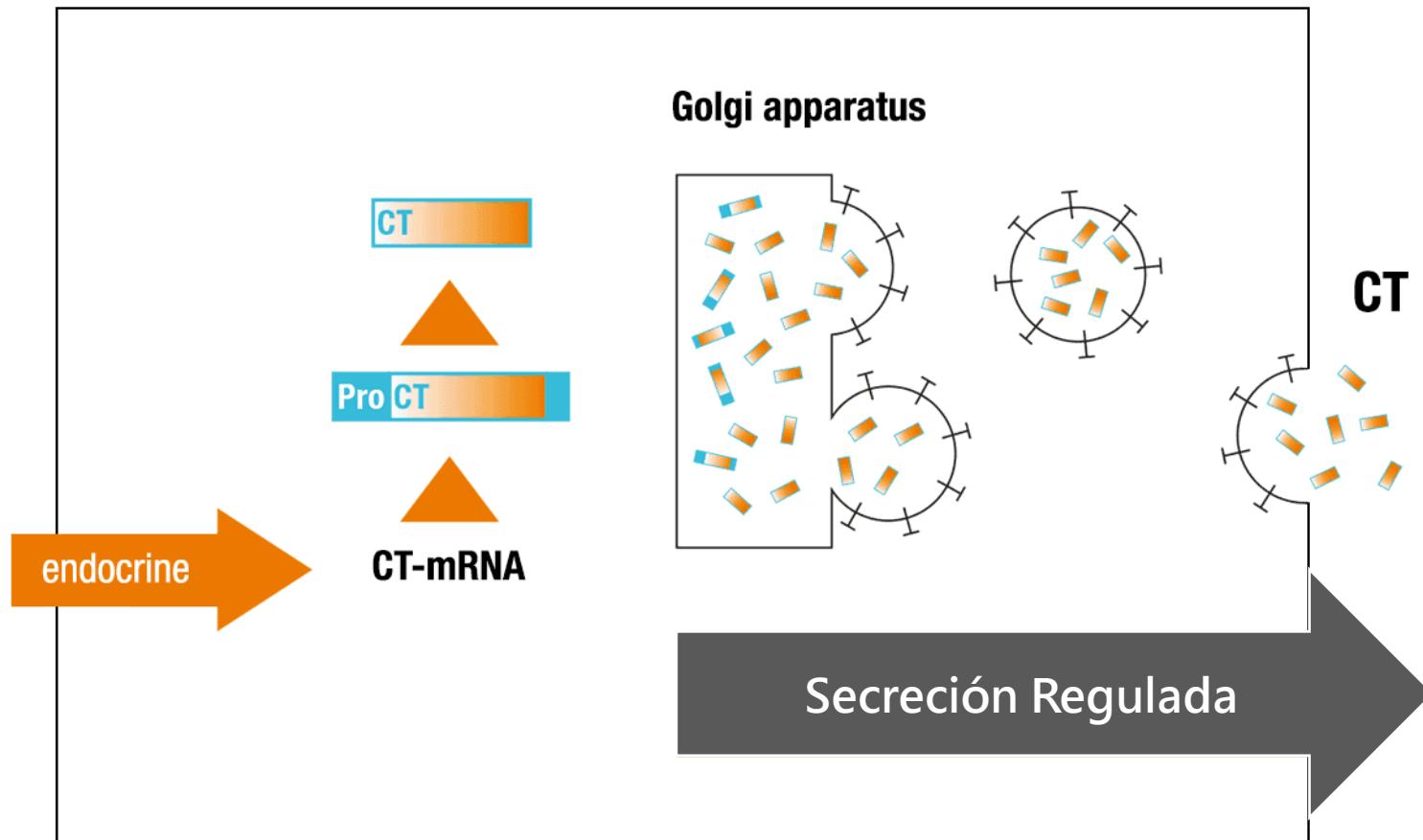
Abbreviations used:

PCT, procalcitonin; CT, calcitonin; CCP-1, calcitonin carboxypeptidase-1; PAM, peptidylglycine α -amidating monooxygenase.

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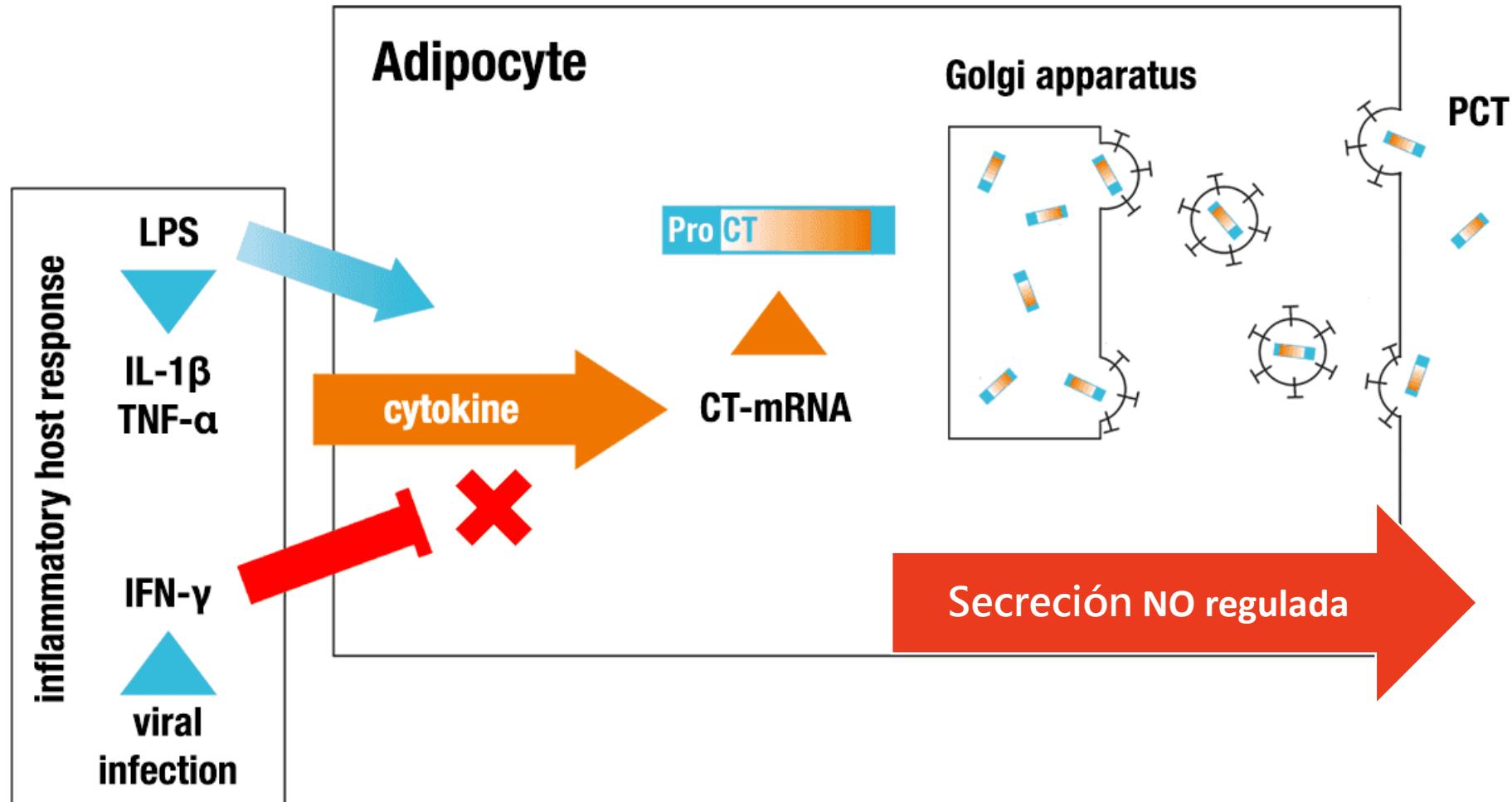
1. Biología

Thyroidal C-cell



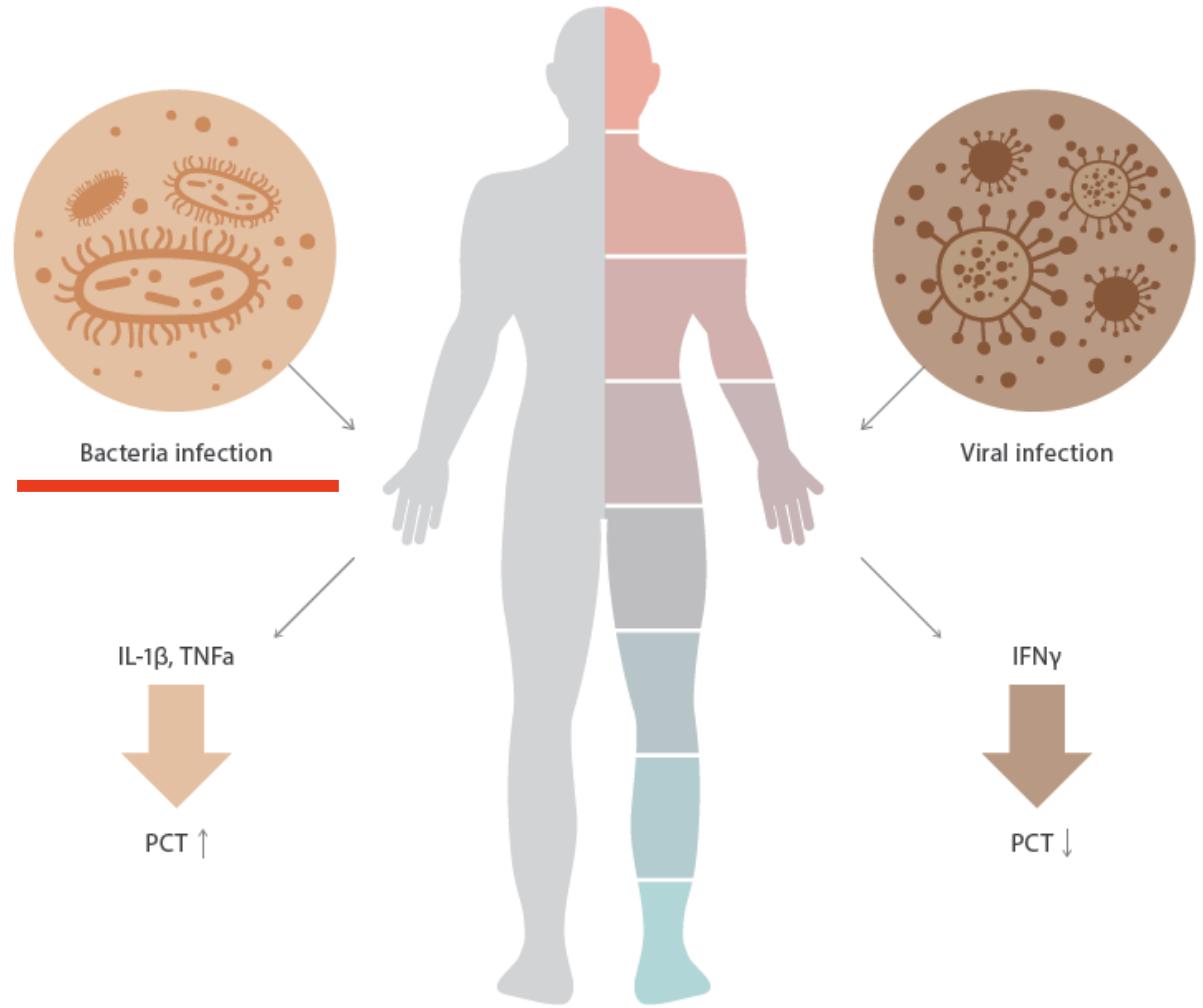
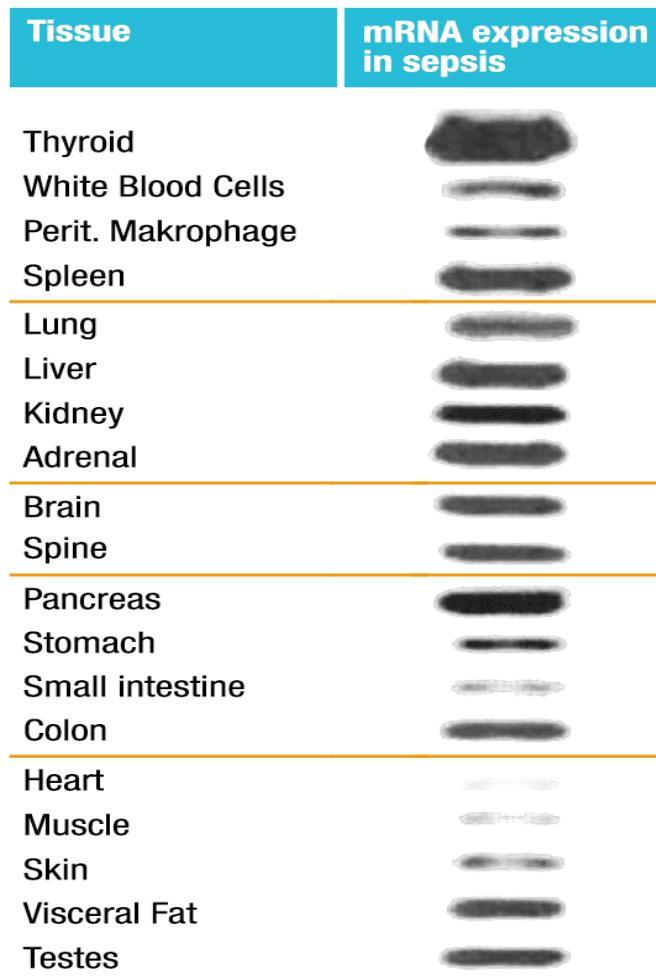
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1. Biología



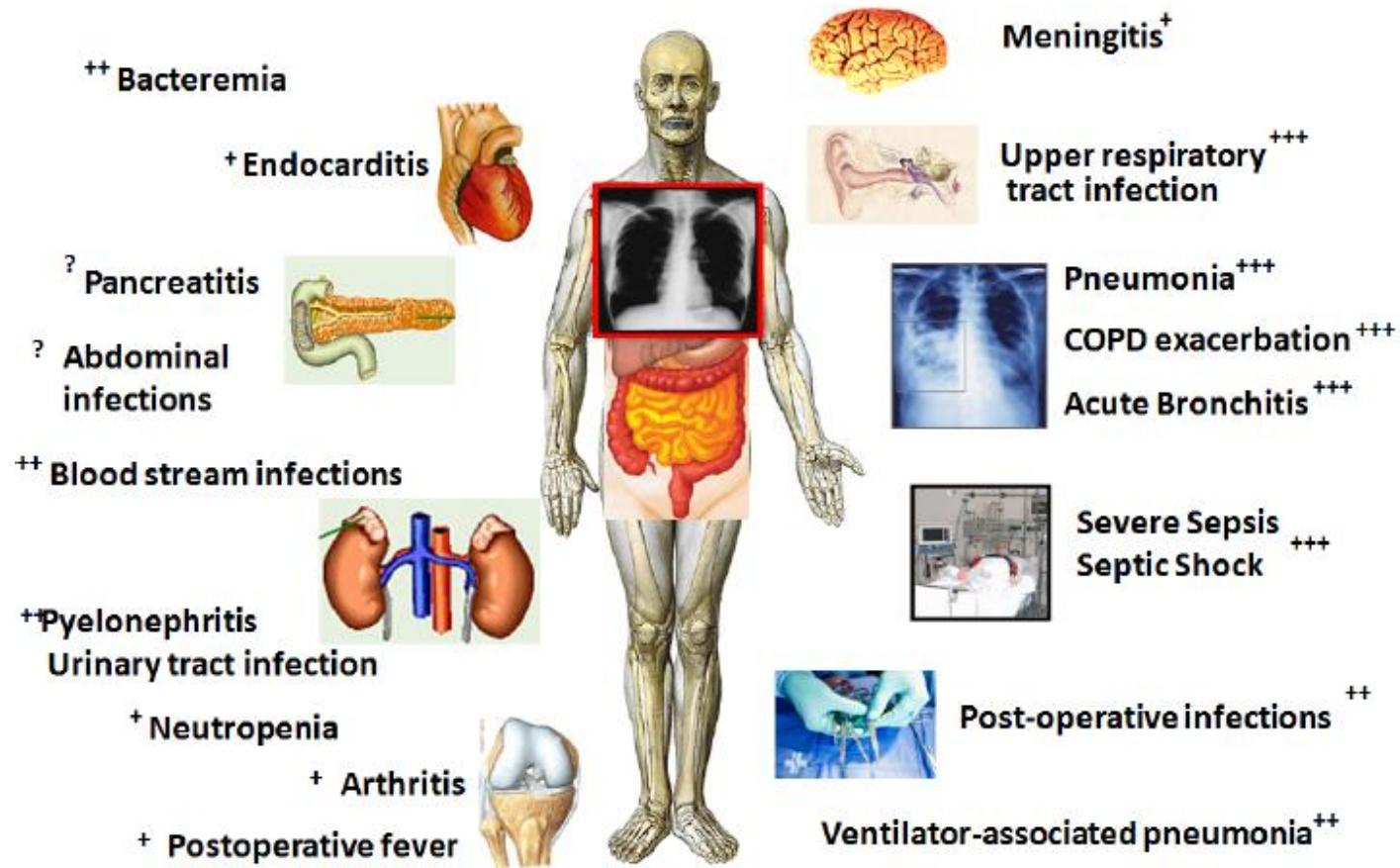
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1. Biología



Adapted from Christ-Crain M et al. Swiss Medical Weekly 2005;135(31-32):451-460

2. Sepsis

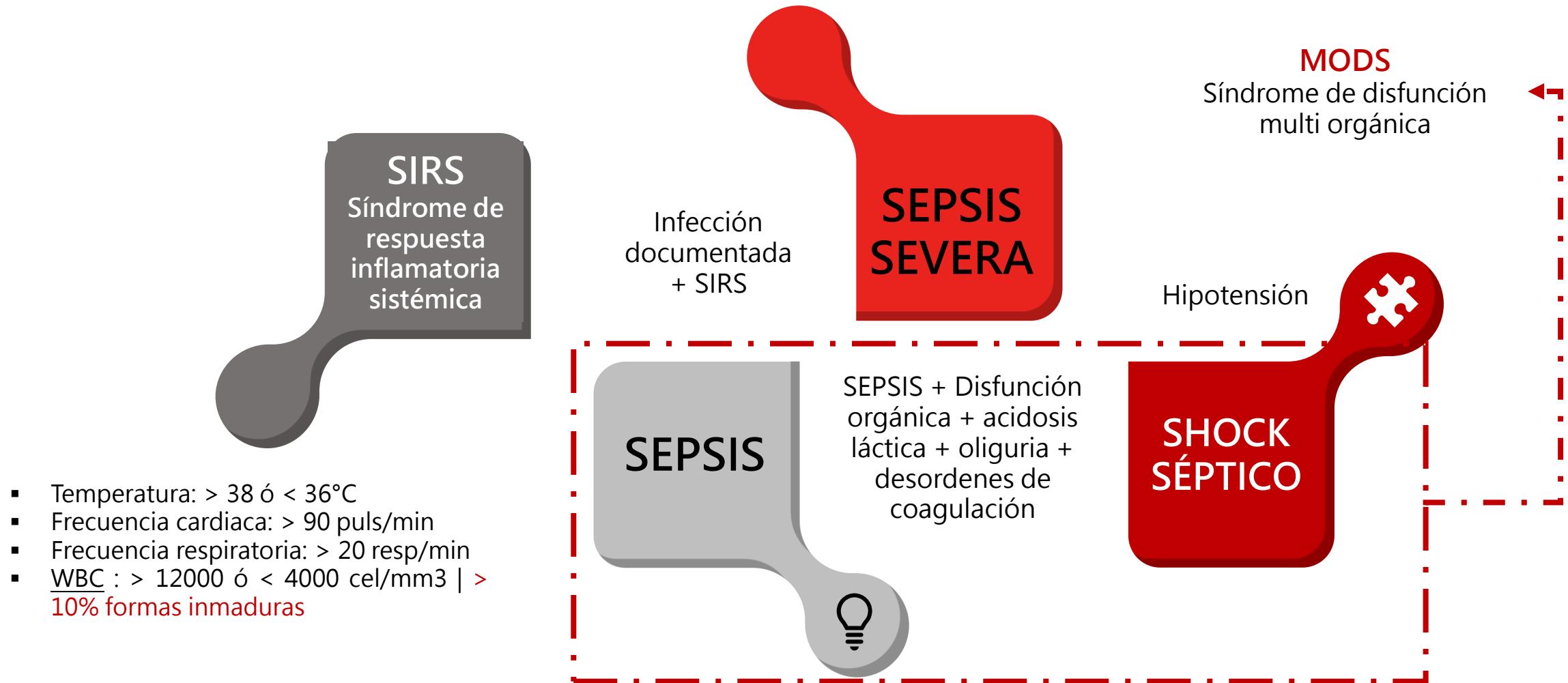


Estudios Observacionales

Estudios de Intervención

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2. Sepsis



~ PCT ~

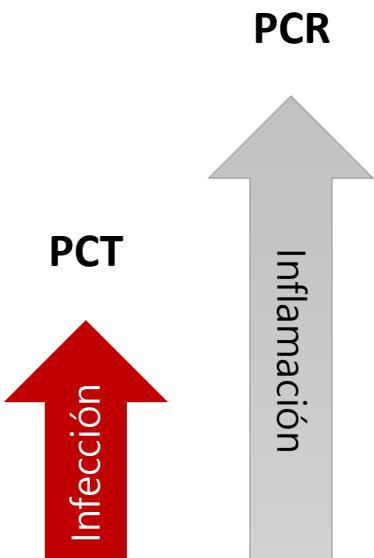
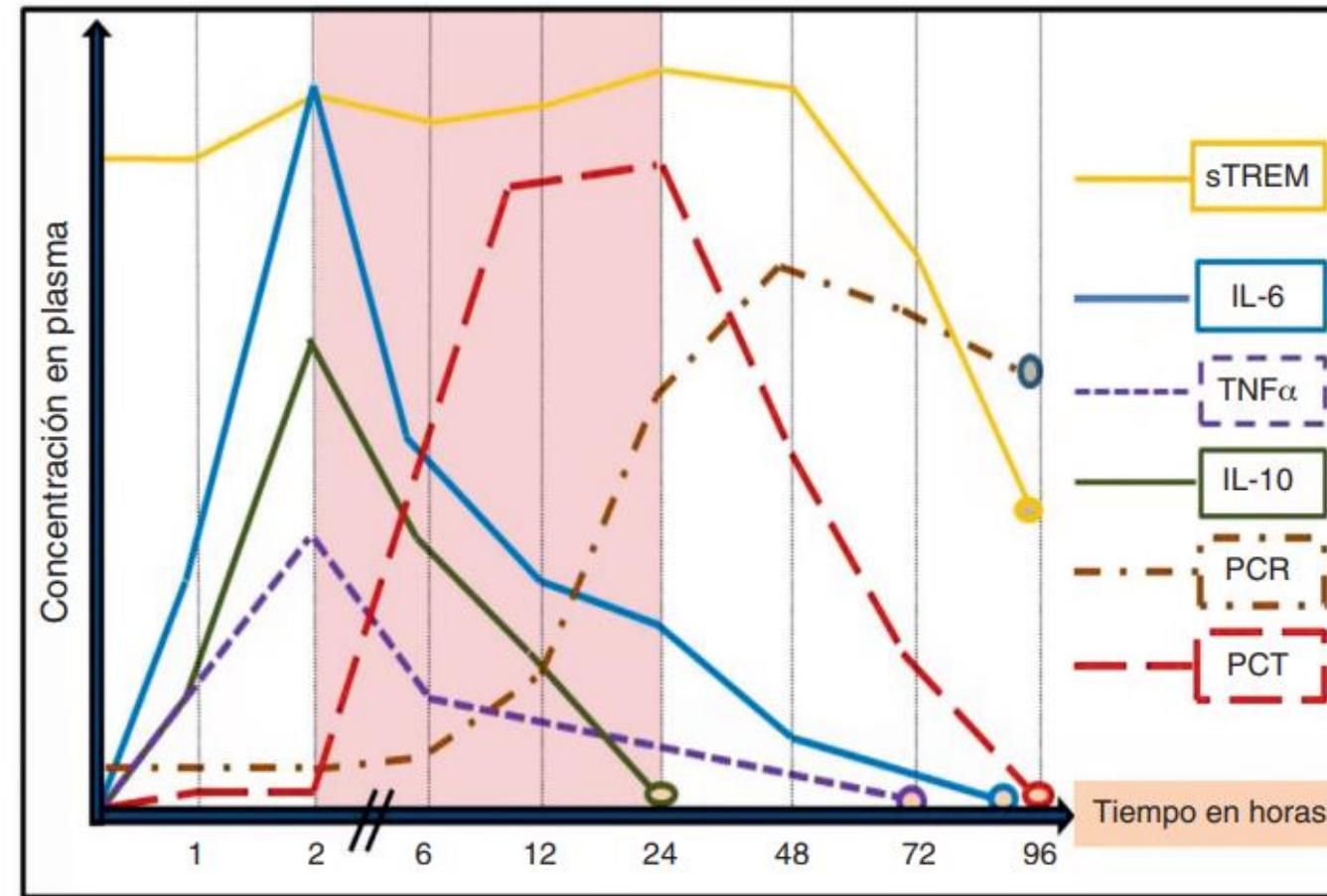
2. Sepsis y selección del Biomarcador

Cinética de los biomarcadores de inflamación e infección

Diagnóstico precoz

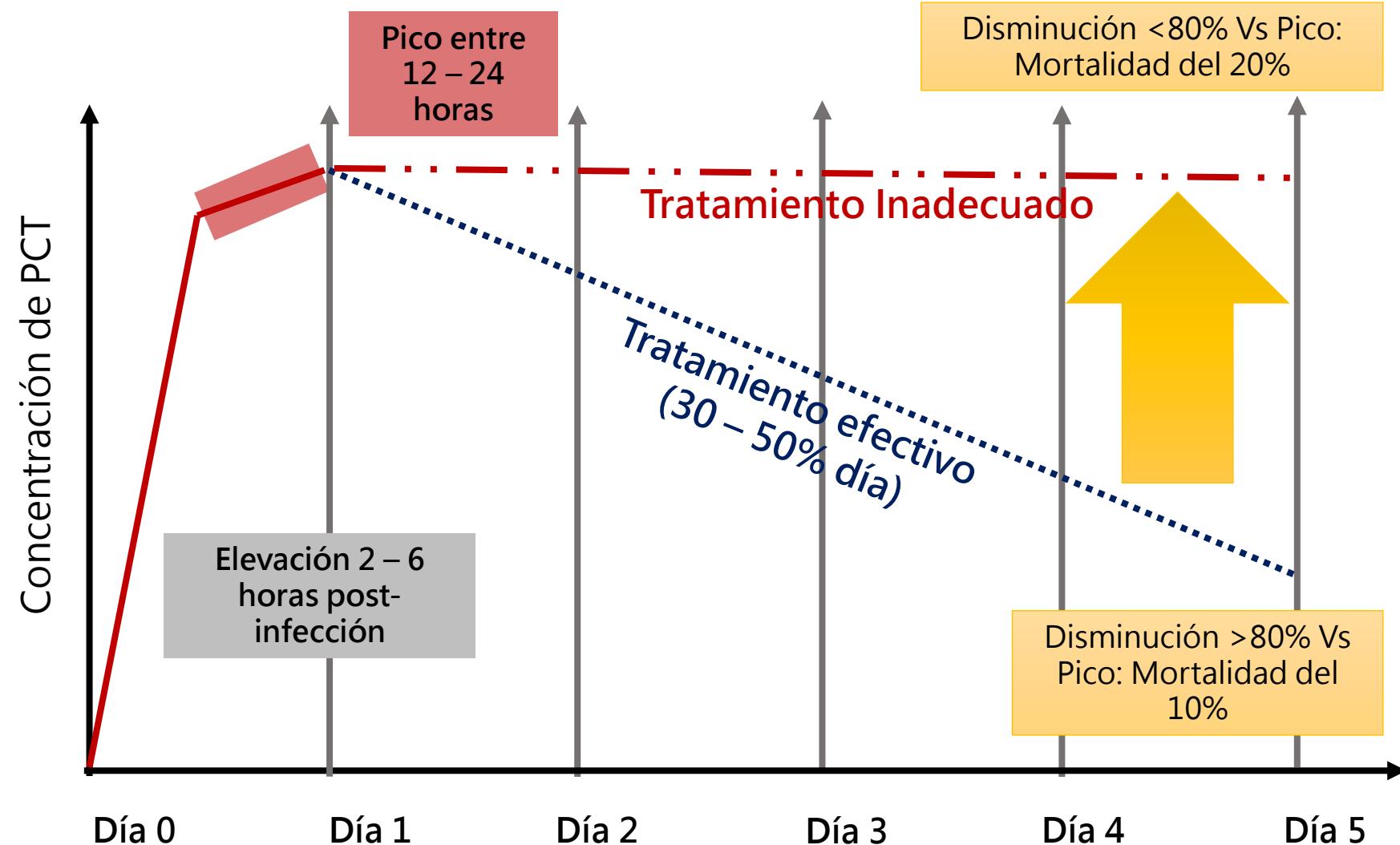
Cuantificar gravedad y estratificación

Monitorizar



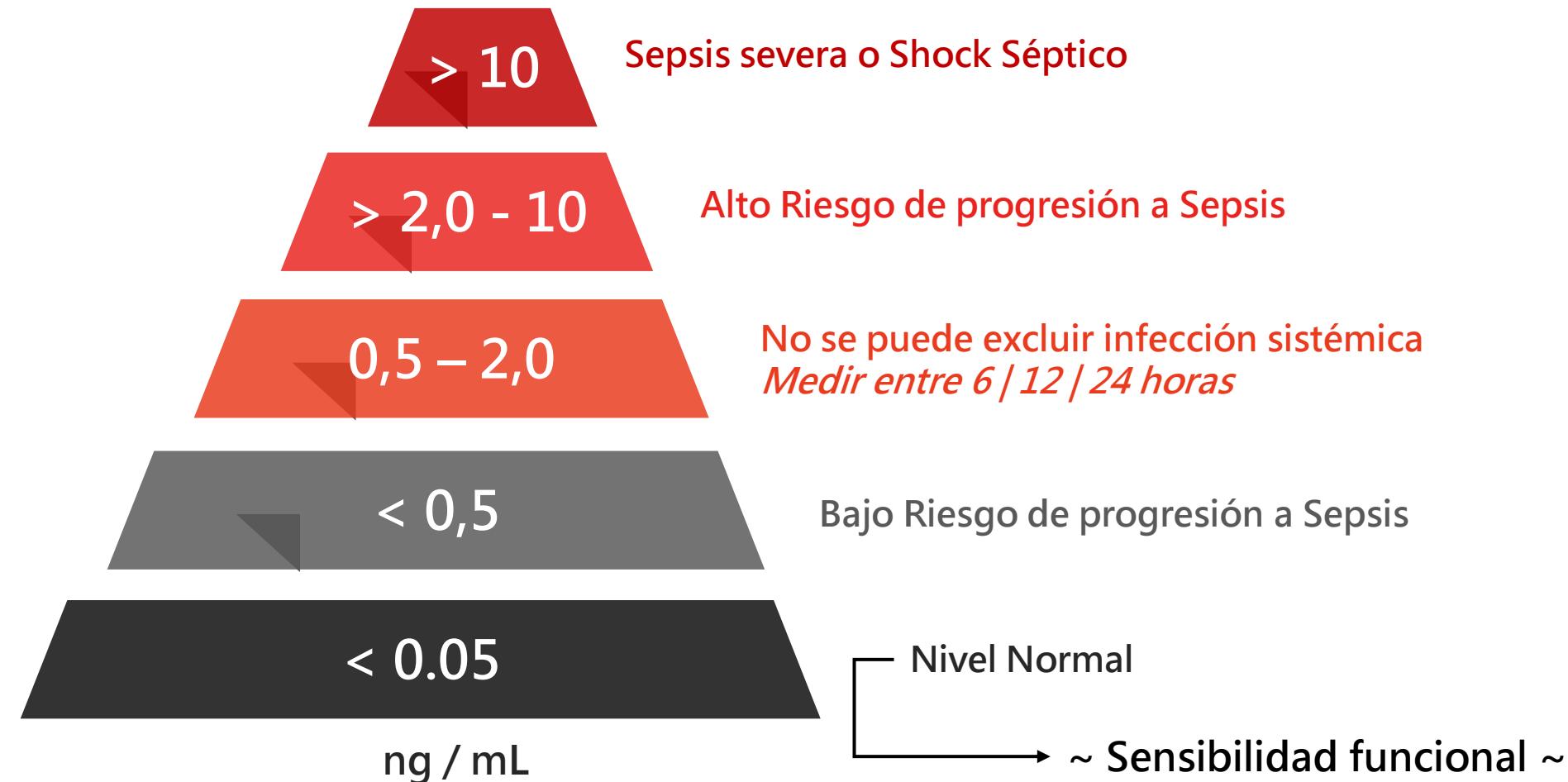
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2. Sepsis y cinética de liberación de PCT



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2. Sepsis – Valores interpretativos



2. Sepsis – [PCT] & Agente Etiológico

Pathogen	(n=486 Bc)	Number of BCs	Median PCT level (IQR) (ng/ml)
GNB			
<i>Escherichia coli</i> [1-5]	97	4.48 (0.86–23.32)	
<i>Acinetobacter baumannii</i> [1,6-9]	39	0.94 (0.17–8.44)	
<i>Klebsiella pneumoniae</i> [2,6,10-12]	36	3.42 (0.61–21.96)	
<i>Pseudomonas aeruginosa</i> [3,7,10,13,14]	17	1.48 (0.42–10.69)	
<i>Burkholderia cepacia</i> [4,8,11,13,15]	18	0.44 (0.24–4.57)	
<i>Enterobacter cloacae</i> [5,9,12,14,15]	13	1.50 (0.46–19.10)	
<i>Serratiamarcescens</i>	6	1.06 (0.08–2.34)	
<i>Klebsiellaoxytoca</i>	2	8.32 (1.57–15.06)	
<i>Acinetobacterlwoffii</i>	2	0.45 (0.29–0.61)	
<i>Proteus mirabilis</i>	4	0.44 (0.24–9.68)	
<i>Salmonella</i> spp.	2	1.90 (0.05–3.74)	
<i>Stenotrophomonasmaltophilia</i>	4	9.54 (4.31–16.95)	
<i>Aeromonashydrophila</i>	2	2.54 (0.61–4.47)	
GPB			
<i>Staphylococcus epidermidis</i>	39	0.31 (0.08–5.32)	
16,17,18,19,20,39			
<i>Staphylococcus aureus</i> [16,21,22,23,24]	35	1.18 (0.3–11.97)	
<i>Staphylococcus hominis</i> [17,21,25,26,27]	35	0.21 (0.08–1.17)	
<i>Enterococcus faecium</i> [18,22,25,28,29]	25	3.36 (0.48–23.07)	
<i>Enterococcus faecalis</i> [19,23,26,28,30]	18	1.24 (0.24–2.28)	
<i>Staphylococcus haemolyticus</i> [20,24,27,29,30]	11	0.41 (0.1–0.82)	
<i>Staphylococcus capitis</i>	9	0.44 (0.25–3.54)	
<i>Streptococcus mutans</i>	2	0.12 (0.10–0.14)	
<i>Paratyphoid C coli</i>	2	0.20 (0.16–0.24)	
<i>Streptococcus viridans</i>	2	4.19 (1.42–6.96)	
<i>Streptococcus pneumoniae</i>	3	7.39 (5.90–19.58)	
<i>Streptococcus mitis</i>	2	0.17 (0.05–0.29)	
<i>Streptococcus oralis</i>	3	0.05 (0.05–0.16)	
<i>Streptococcus salivarius</i>	2	31.97 (29.32–34.62)	
<i>Streptococcus agalactiae</i>	2	9.36 (0.28–18.43)	
Fungi			
<i>Candida albicans</i>	19	1.11 (0.41–2.24)	
<i>Candida parapsilosis</i>	5	0.79 (0.40–1.70)	
<i>Candida tropicalis</i>	2	5.37 (0.29–10.45)	



Sepsis por microflora? → Contaminación < 0,5 ng/mL



Sepsis por patógenos oportunistas < 1 ng/mL

"No descartar gravedad:
Resistencias intrínsecas a AB"

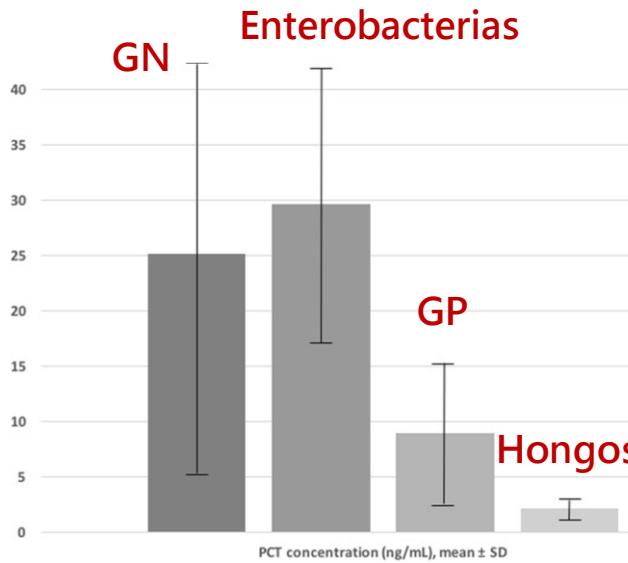


Sepsis por patógeno "real" > 1 ng/mL

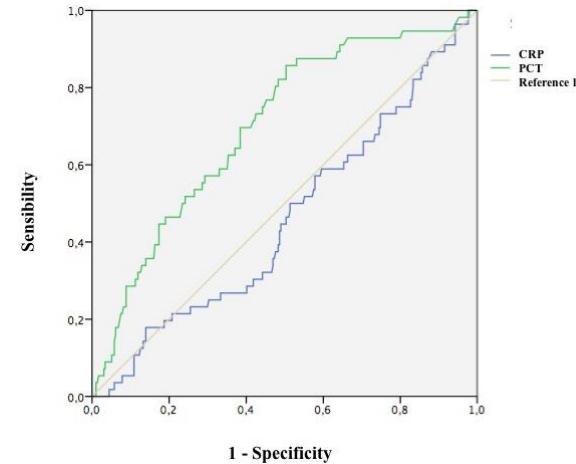
Cut-Off 10,3 : > GN

2. Sepsis & PCR

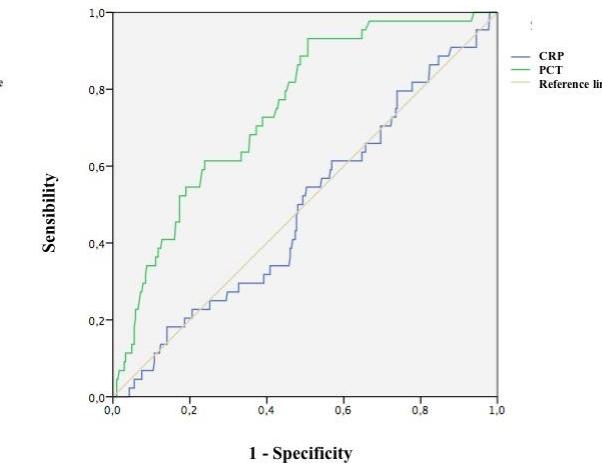
Predicción de Hemocultivos positivos en UCI



Gram Negativos (n=141)



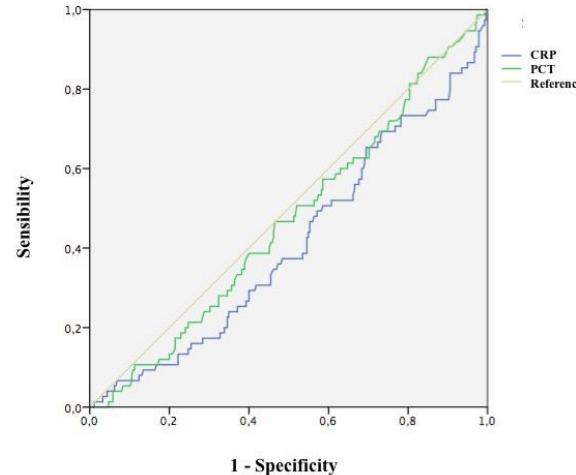
Enterobacterias



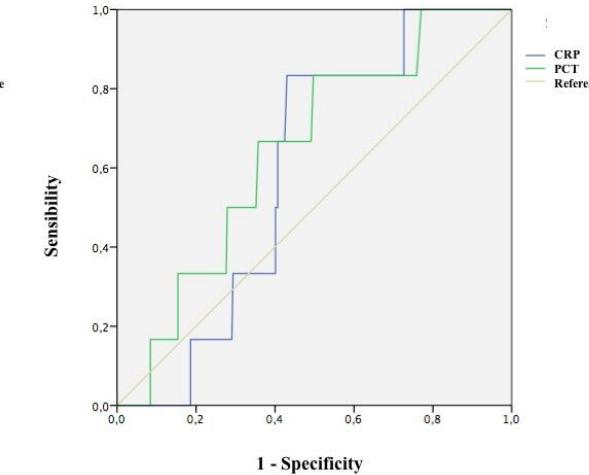
PCT

PCR

Gram Positivos (n=106)

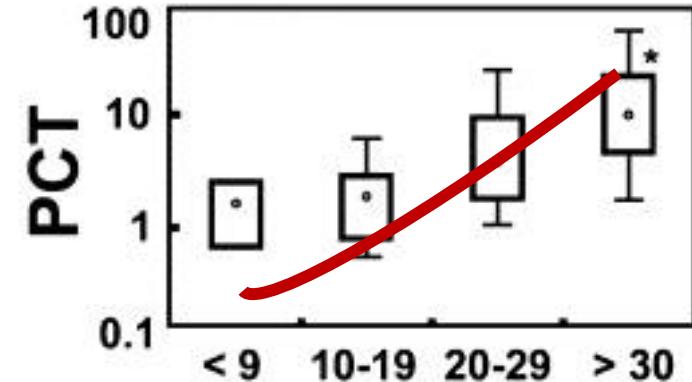
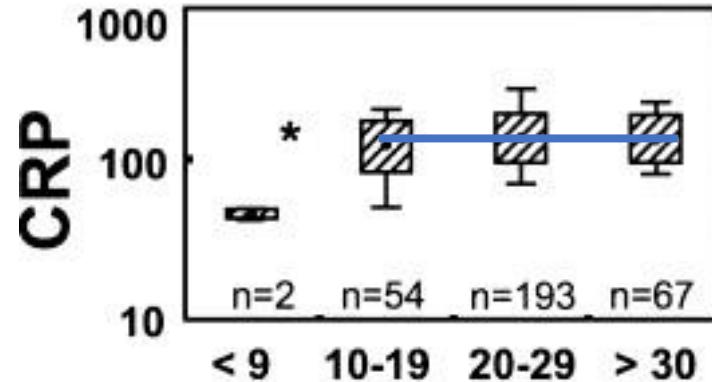


Hongos (n=11)

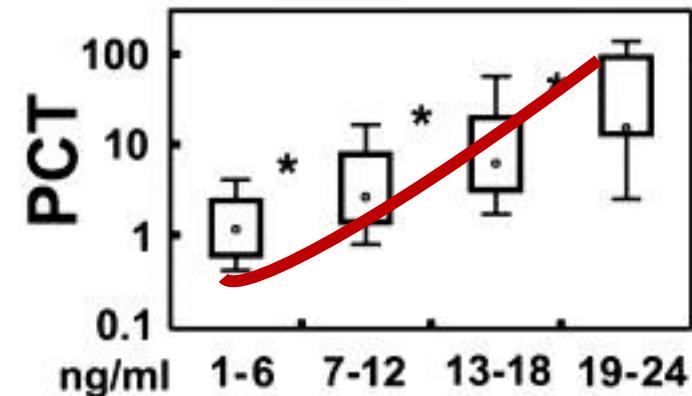
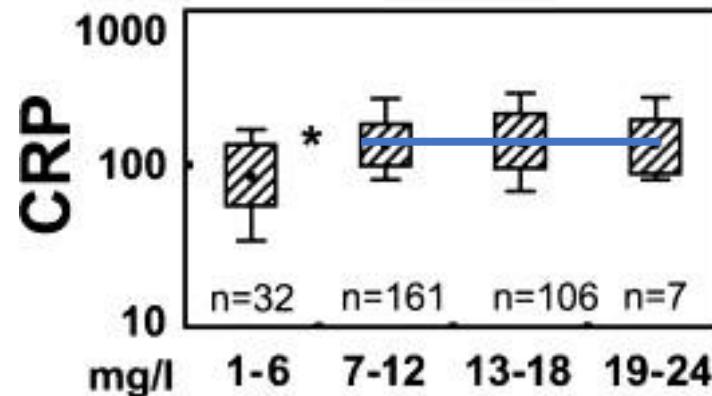


2. Sepsis & CPR : UCI

APACHE II-Score



SOFA-Score



Acute physiology and
chronic health evaluation II

Sequential organ failure
assessment

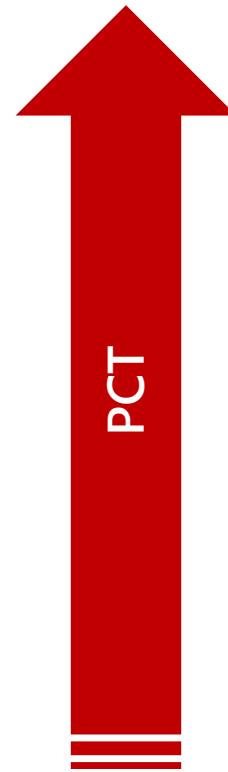
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2. Sepsis – ¿PCT Siempre alta?

Sepsis

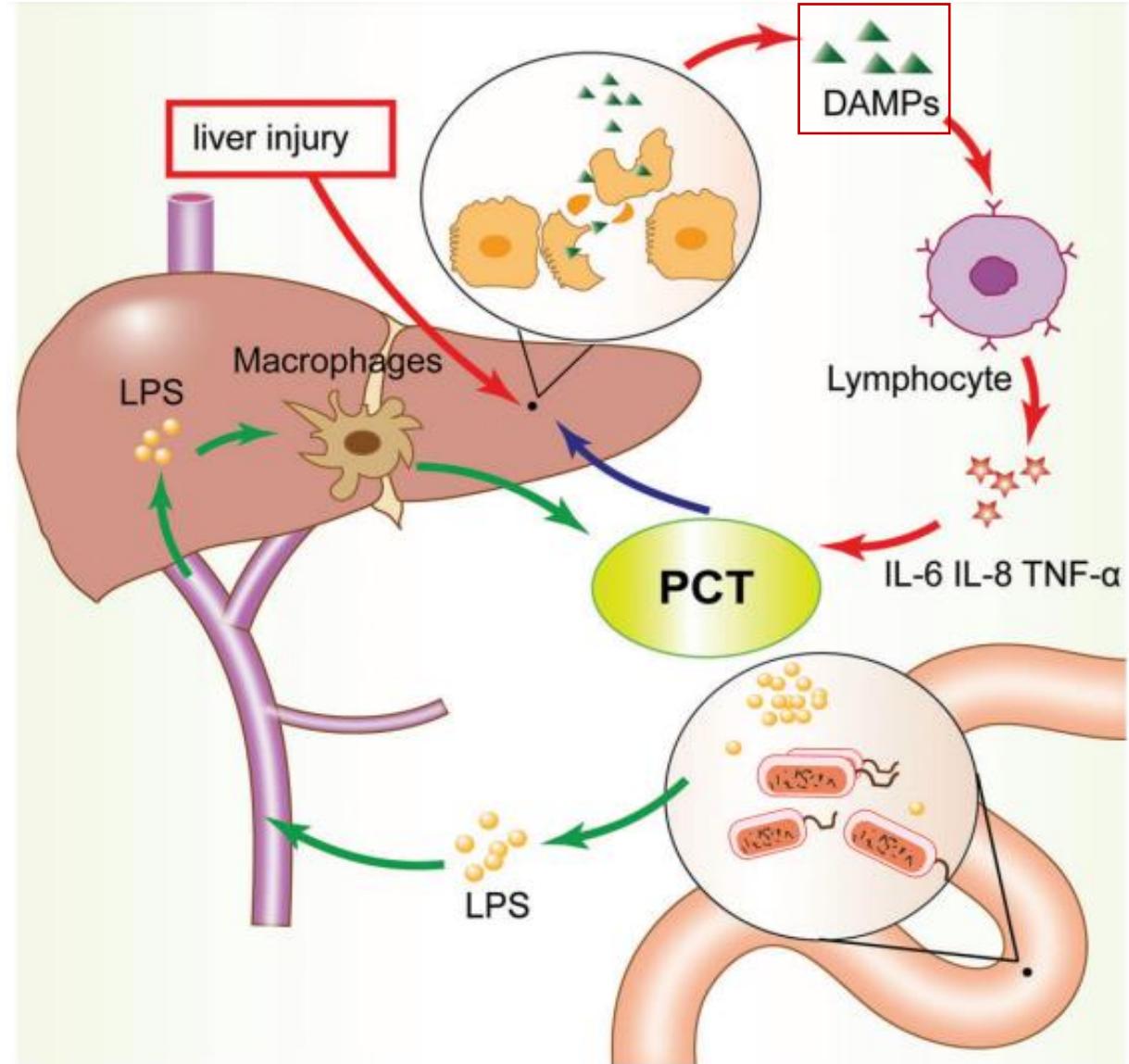
AB Stewardship

LTRI



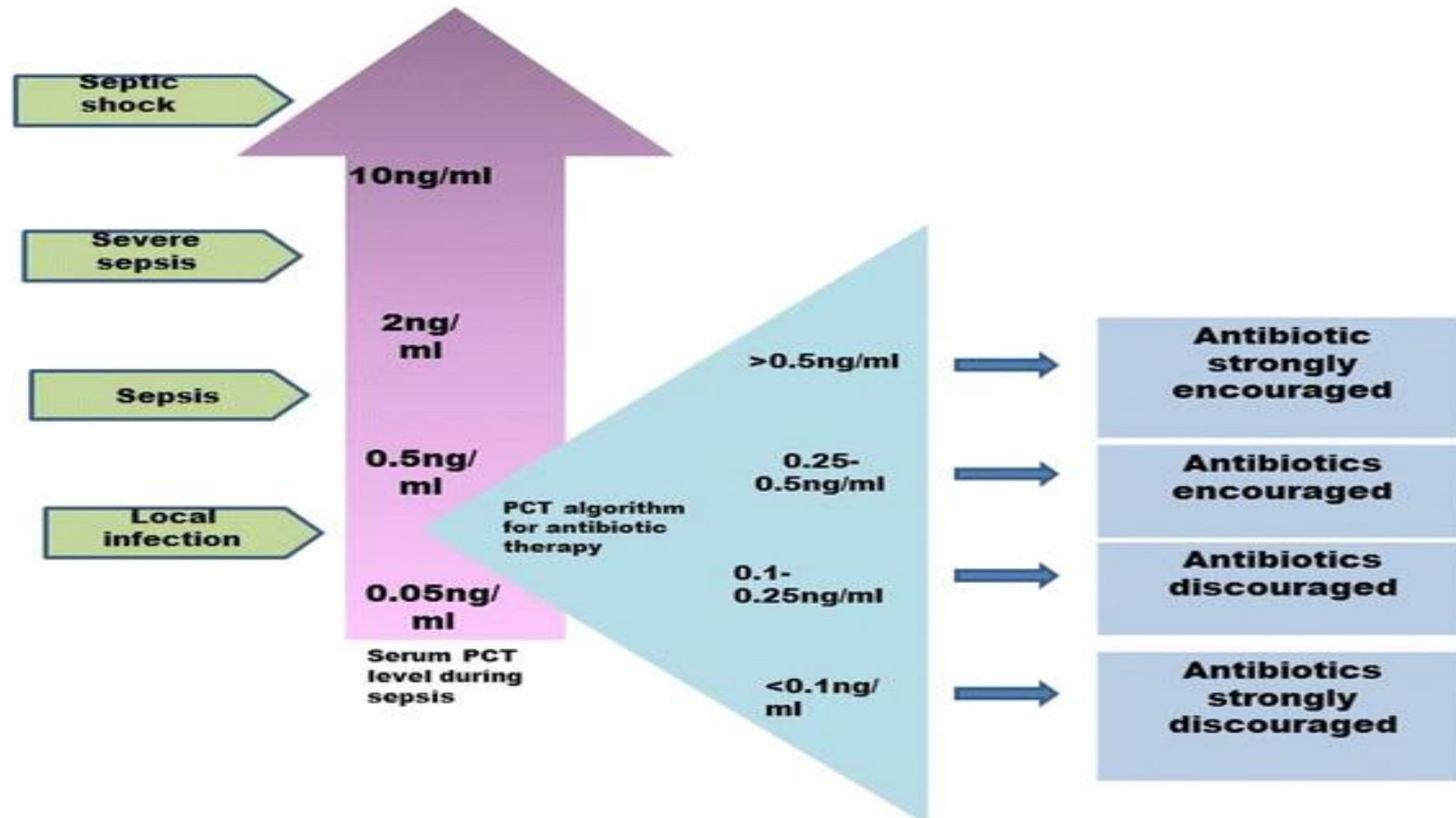
Falla Hepática

Damage-associated molecular patterns (DAMPs)



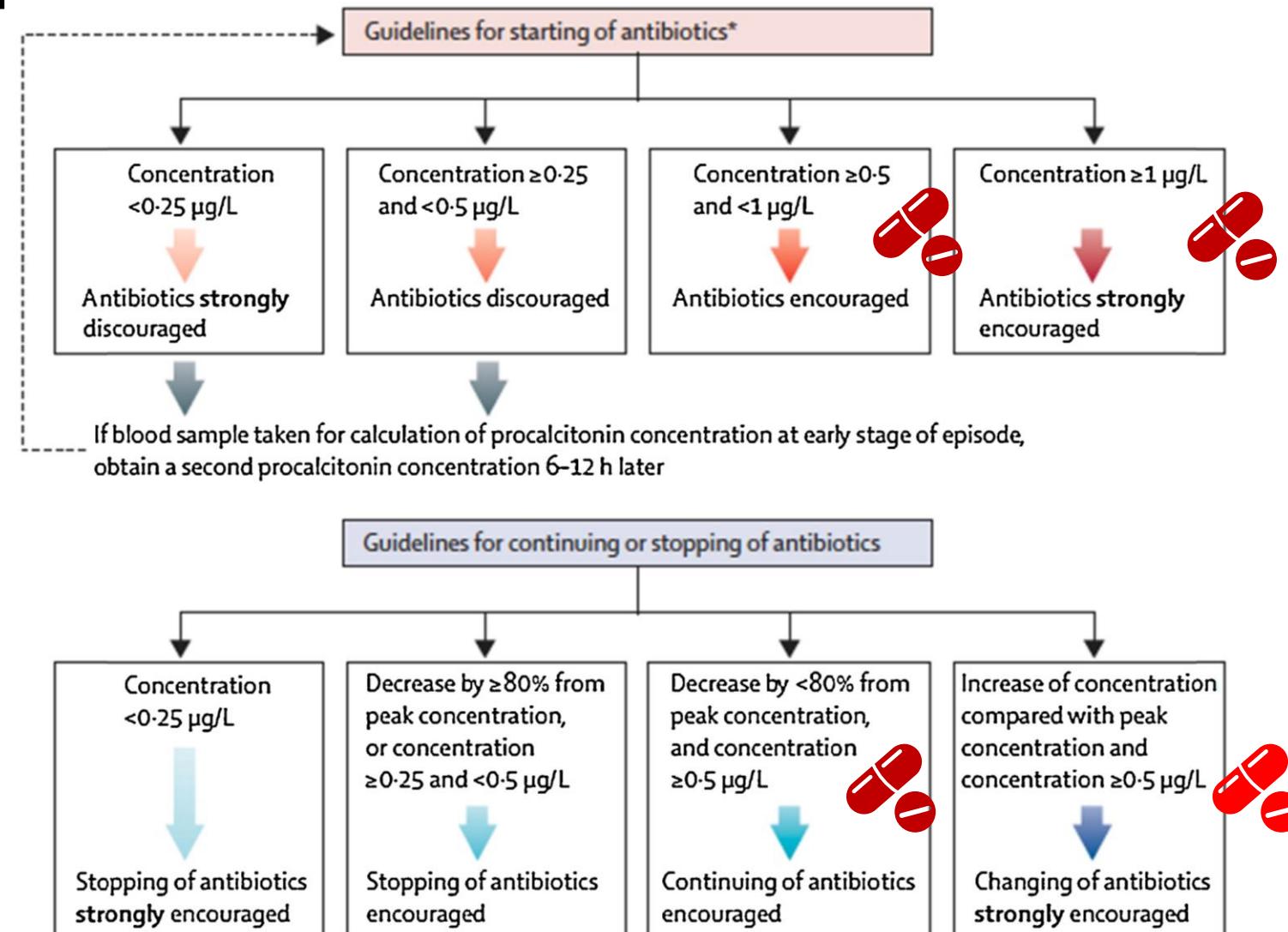
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3. AB Stewardship



~ PCT ~

3. AB Stewardship: UCI



~ PCT ~

3. AB Stewardship: No UCI



Antibiotic Initiation		
PCT Value	Antibiotic Use Recommendation	Discussion
<0.1 ng/mL	Strongly discouraged	<ul style="list-style-type: none"> ○ Repeat in 12 to 24 hours if needed ○ <0.1 ng/mL consider nonbacterial diagnosis
0.1 – 0.24 ng/mL	Discouraged	
>0.24 – 0.5 ng/mL	Encouraged	<ul style="list-style-type: none"> ○ Consider repeating every 24 hours to evaluate the opportunity for early cessation
>0.5 ng/mL	Strongly encouraged	



Antibiotic Discontinuation*		
PCT Value	Antibiotic Use Recommendation	Discussion
<0.25 ng/mL or drop by 90%	Cessation strongly encouraged	* Not recommended for the immunocompromised, endocarditis, osteomyelitis, and skin & skin structure infections
0.25 to 0.5 ng/mL or drop by 80%	Cessation encouraged	
>0.5 ng/mL and drop <80%	Continuation encouraged	

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3. AB Stewardship

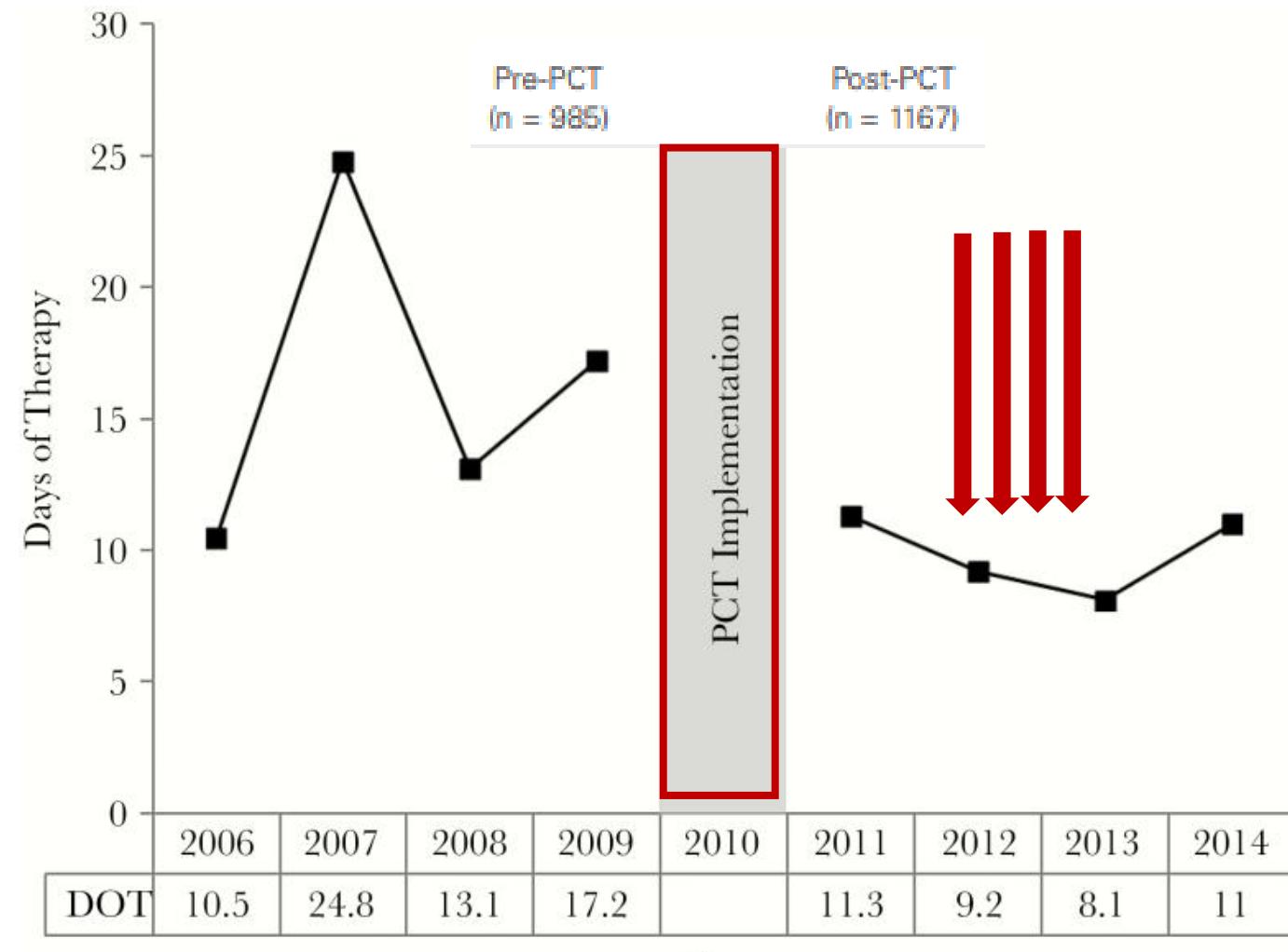
- Prospectivo
- 9 años
- n = 1252



Costos al sistema



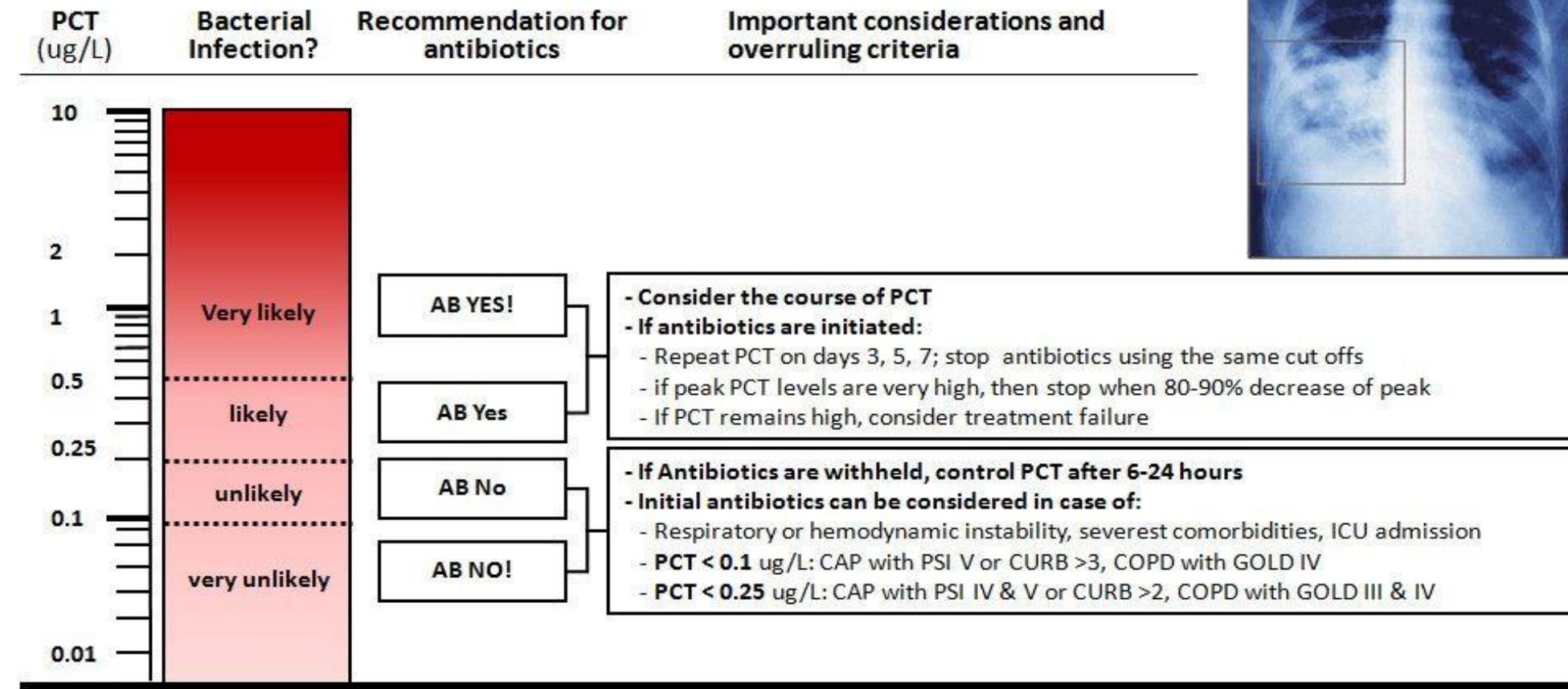
Sobre-infecciones



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4. LTRI: Infecciones del Tracto Respiratorio Inferior

PCT algorithm for patients with respiratory tract infection

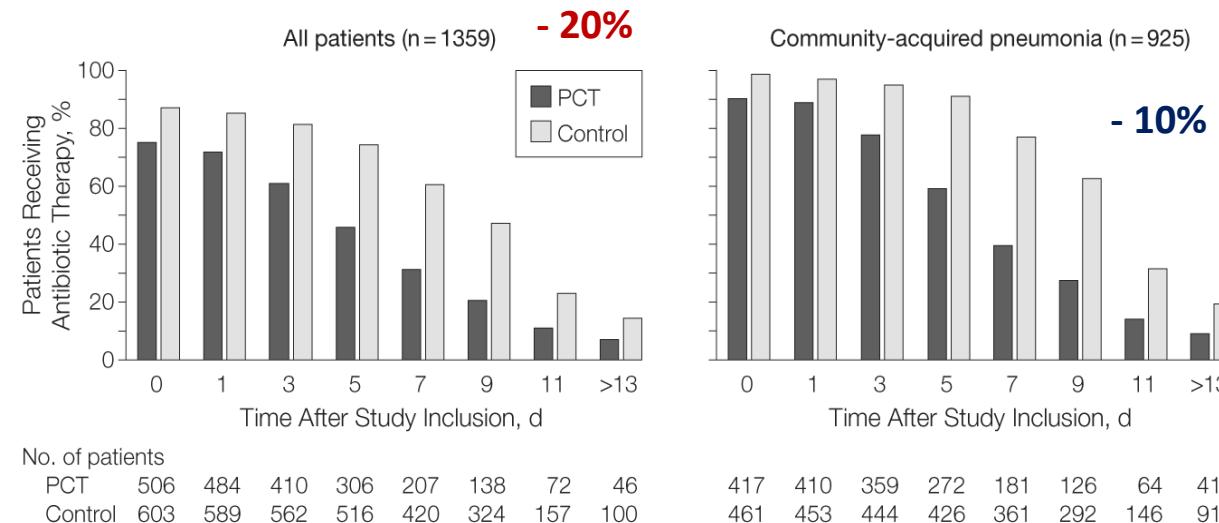


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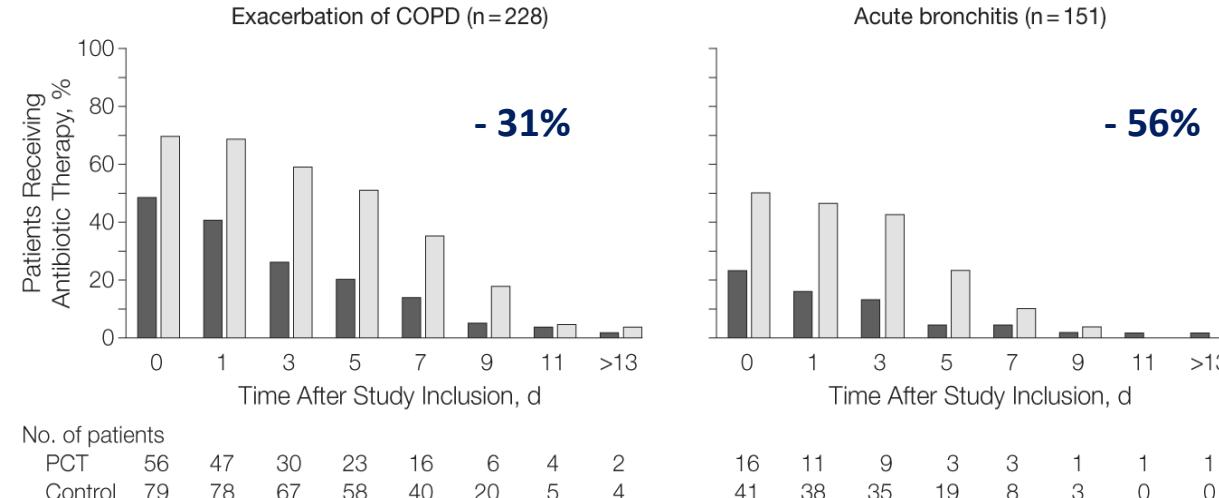
4. LTRI



Tiempo de Exposición a AB



Escalamiento

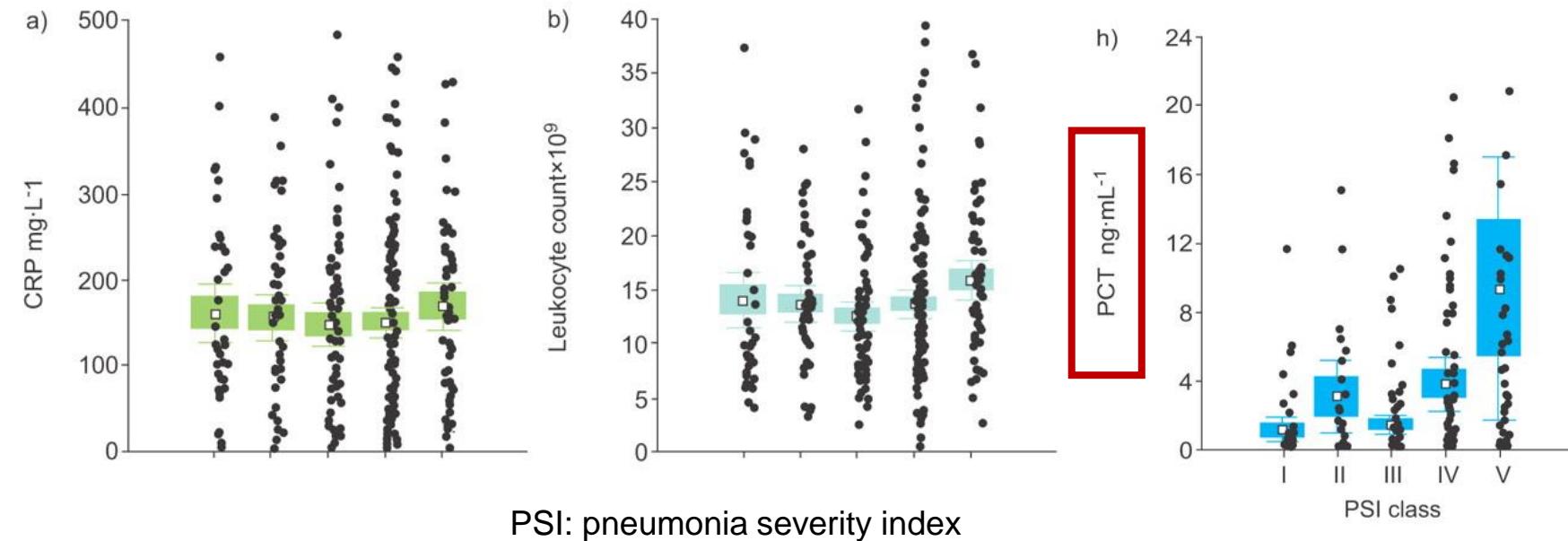


COPD, chronic obstructive pulmonary disease.

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4. LTRI & CRP

Prognostic assessment in community-acquired pneumonia.



$$\text{Delta PCT} = \frac{\text{PCT Peak} - \text{PCT current}}{\text{PCT current}} \times 100\%$$

Antibiotic therapy may be discontinued if
PCT_{Current} is $\leq 0.25 \text{ ng/mL}$ or if the $\Delta\text{PCT} > 80\%$

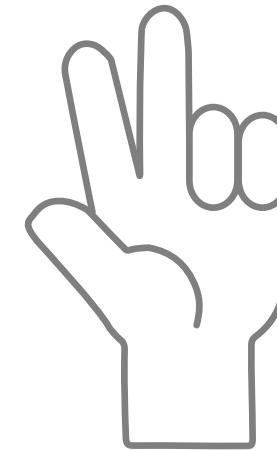
Consideraciones especiales en la interpretación de PCT



Oncología



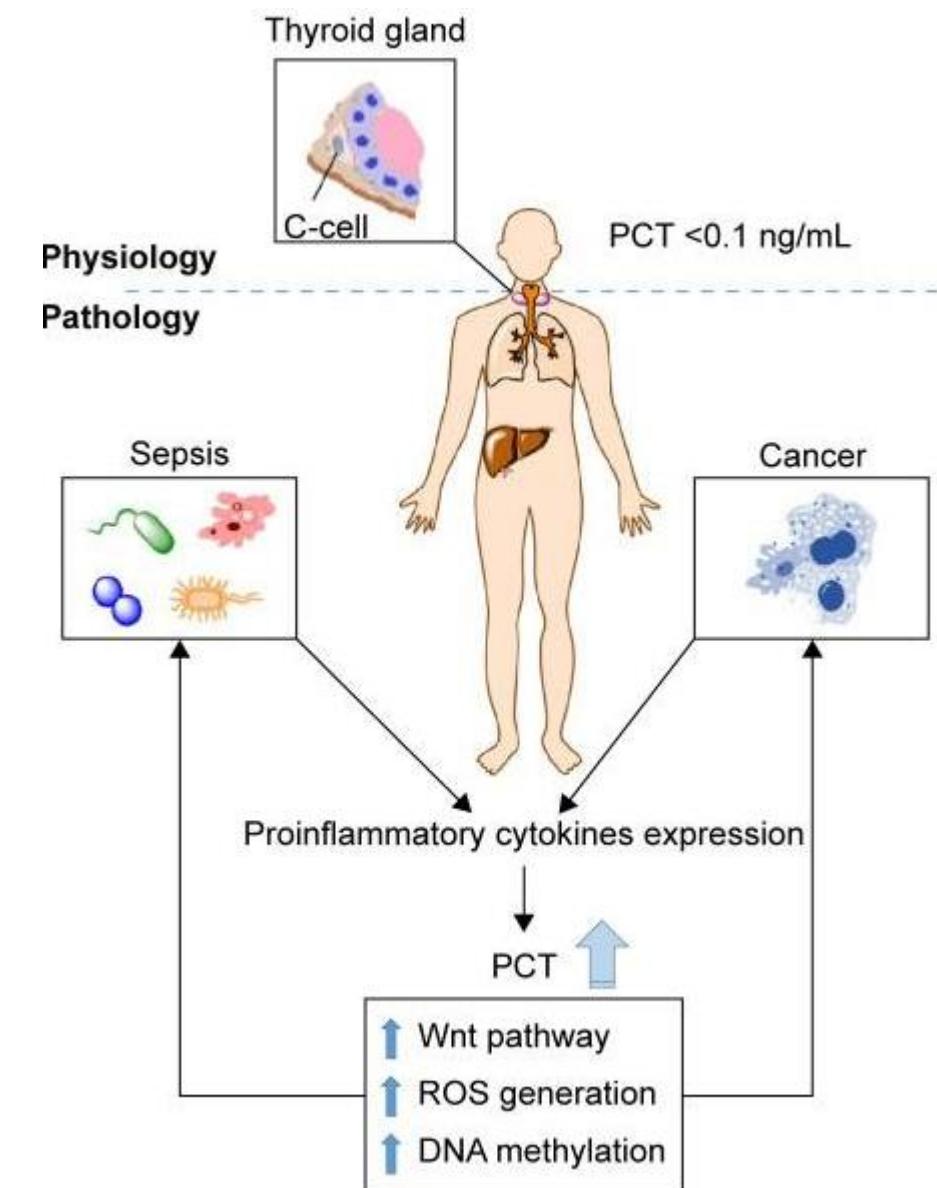
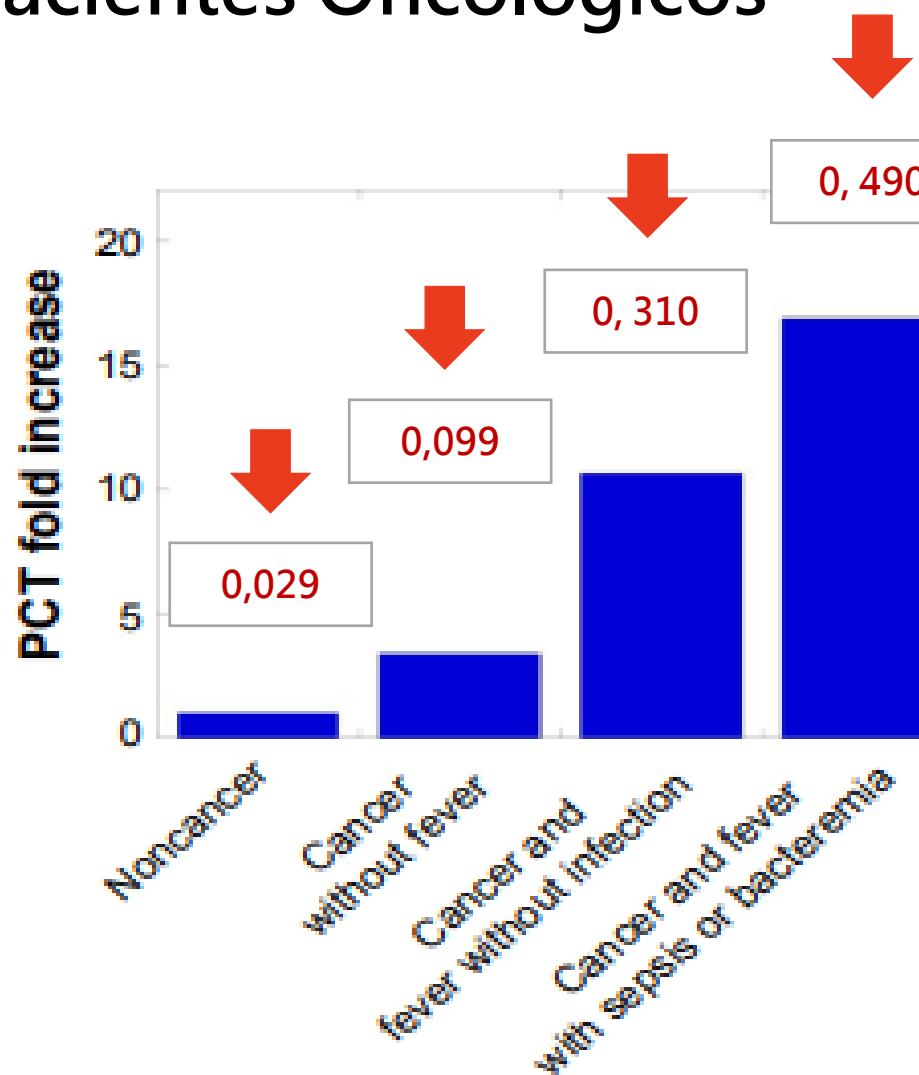
Recién
Nacidos



Gestantes

~ PCT ~

Pacientes Oncológicos

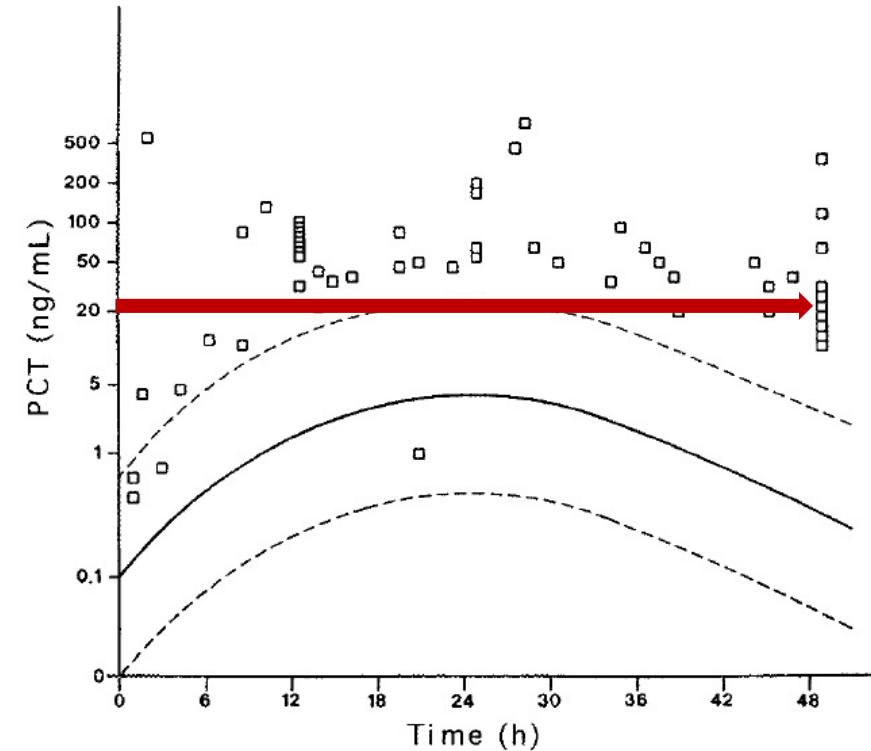
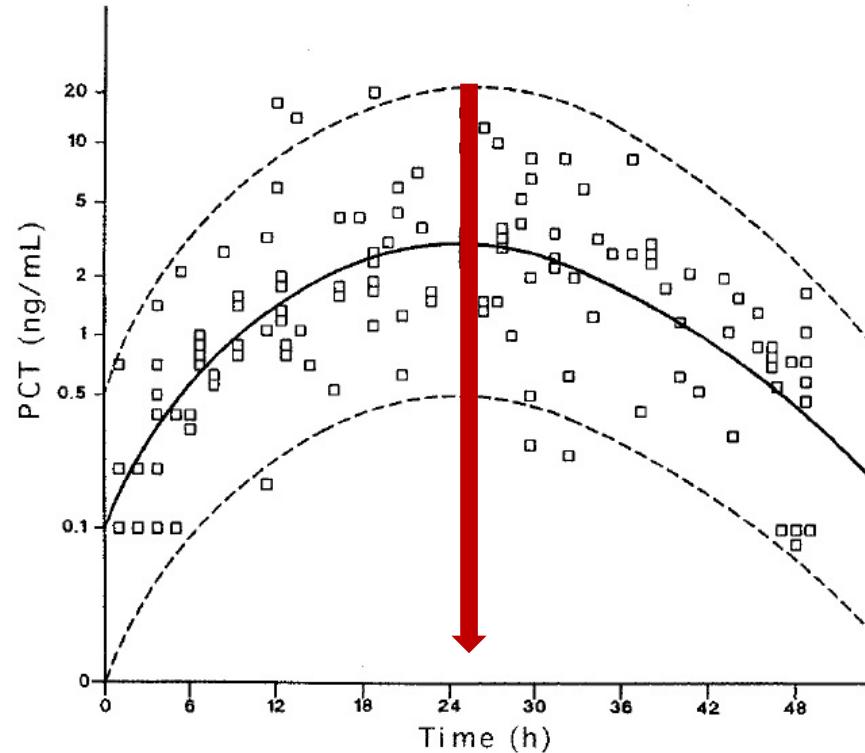


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Recién Nacidos

10 ng/mL
24 horas

2 ng/mL
Día 2



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Gestantes

Células Estromais & Trofoblásticas

Table 2 Evolution of PCT levels (median and ranges) at the end of pregnancy and in the postpartum according to the mode of delivery.

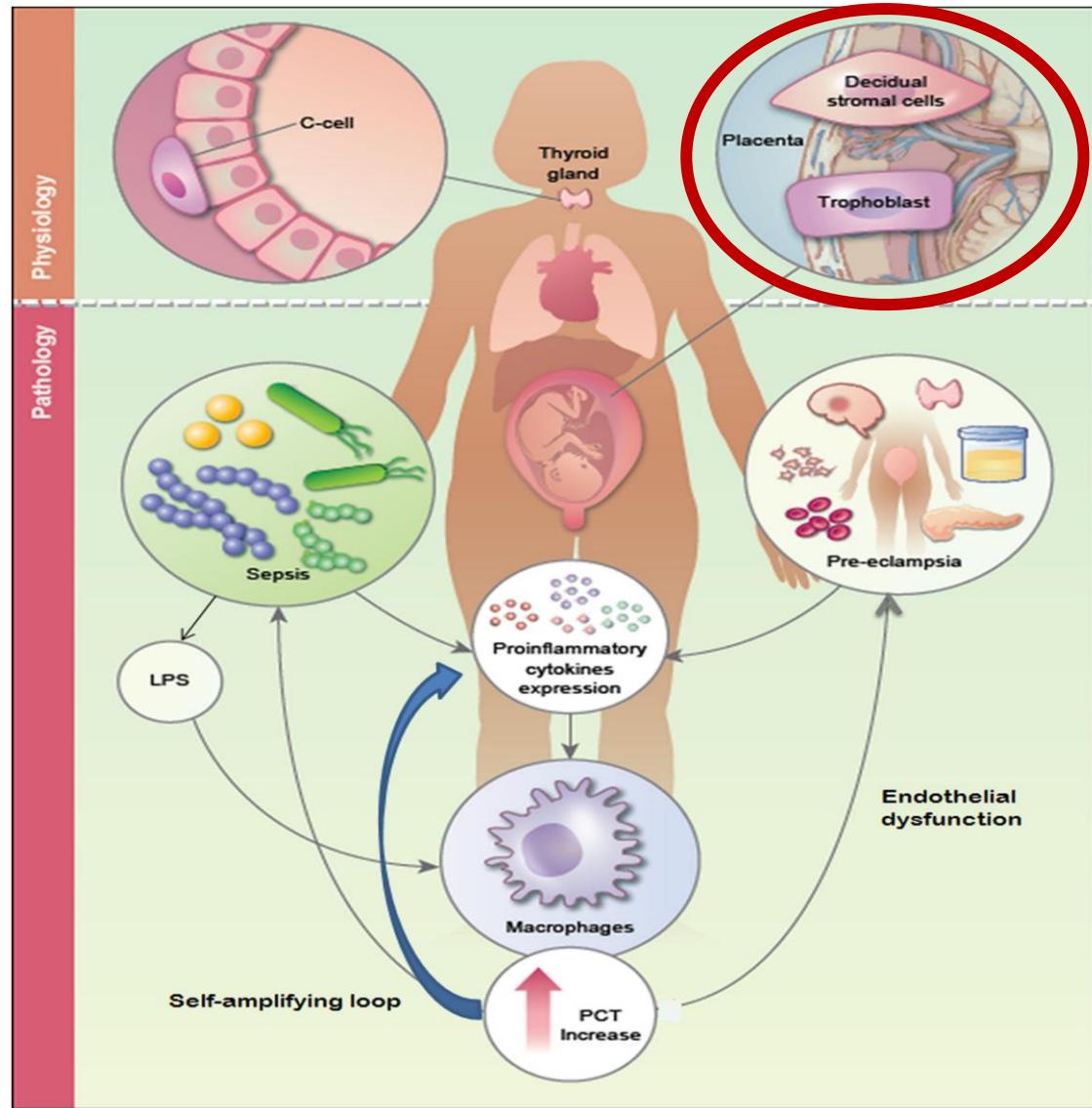
	Vaginal delivery (n=31)				Cesarean section (n=29)				P-value
	n*	Range	Median	Women (n) with values >0.25 µg/L	n*	Range	Median	Women (n) with values >0.25 µg/L	
At 24–28 weeks	29	0.01–0.07	0.04	0	8**	0.03–0.08	0.05	0	0.14
At 36–40 weeks	31	0.01–0.11	0.06	0	29	0.03–0.10	0.07	0	0.05
At delivery	29	0.01–0.15	0.07	0	29	0.02–0.11	0.07	0	0.40
At day 2–3	28	0.03–5.00	0.07	2	29	0.05–0.56	0.10	3	<0.01
At day 10	27	0.02–0.12	0.05	0	26	0.03–0.10	0.07	0	<0.01

*Two samples at 24–28 weeks, one during labor, two at D2–3 and seven at D10 were missed.

**Twenty-one women were included at 35–36 weeks of gestation when the indication for cesarean section was established. No sampling at 24–28 weeks.

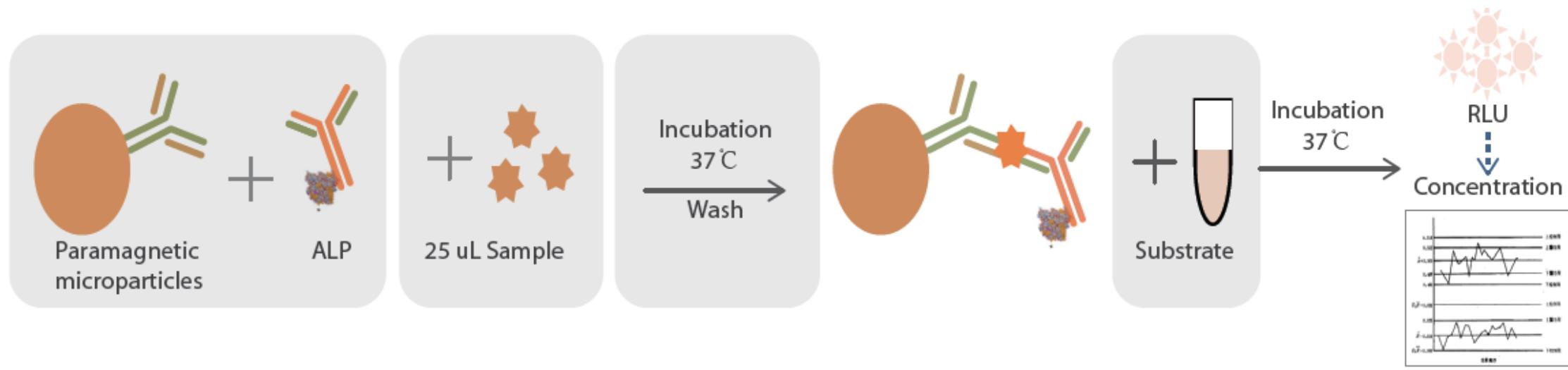


< 0,25 ug/L | ng/mL



~ PCT ~

Mindray



< 0,05 ng/mL

System	Sample Type	Linearity Range (ng/mL)	Precision (total, CV)	Dilution	Sample Volume (μL)	Time to First Result (min)
Mindray	serum, plasma (EDTA, sodium heparin, lithium heparin)	0.02 - 100	≤8%	1:4 (auto & manual)	25	17

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Conclusiones

01



PCT como marcador de carga bacteriana y severidad de la infección (bacteriana y micótica)

02



Relación PCT – Uso racional de AB: tiempo de terapia AB + costos para el sistema

03



PCT y otros marcadores (PCR): mayor correlación con severidad de la infección y pronóstico en menos tiempo

04



PCT y AB: Terapia escalamiento y desescalamiento -> Decisión médica

A composite image featuring two female scientists in white lab coats. One scientist is in the foreground, looking down at a tray filled with small test tubes. Another scientist is visible behind her, also focused on the same tray. The background is a soft, out-of-focus light.

mindray

Gracias !

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