

Drug allergy diagnosis

- routine beyond skin test and IgE

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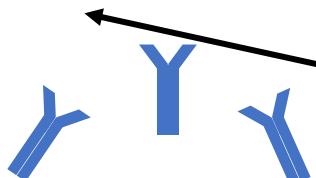


Drug Hypersensitivity (DHR)

Immediate type
hypersensitivity



urticaria, anaphylaxis



Delayed type
hypersensitivity



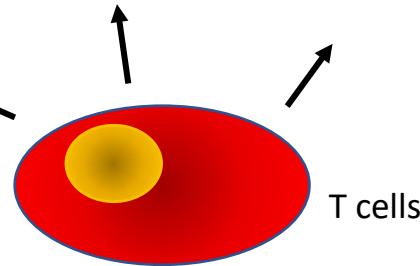
maculopapular
exanthema
(MPE)



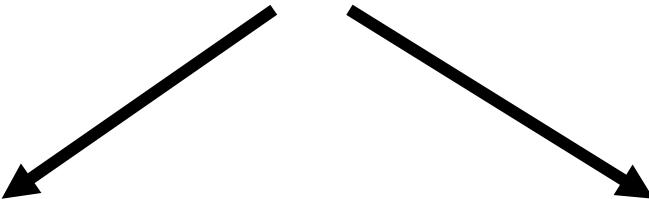
DRESS



SJS/TEN



Lab diagnosis in DHR



Acute phase

Immediate type

Tryptase

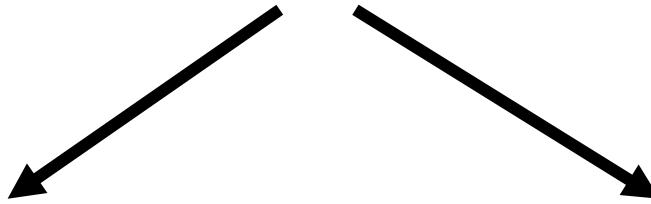
Delayed type

Eosinophils

ECP

Organ specific
(liver, kidney)

Lab diagnosis in DHR



Acute phase

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Tryptase

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Eosinophils

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Organ specific
(liver, kidney)

Work-up

Immediate

IgE

Basophil

activation
test (BAT)

Delayed type

Lymphocyte
transformation
test (cyto-LTT)

Lab diagnosis in DHR



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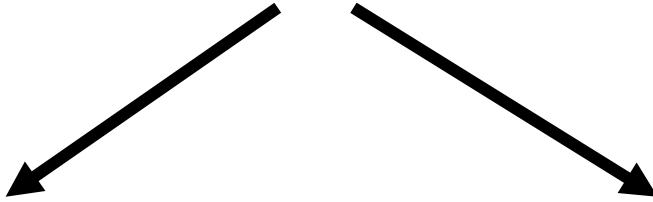
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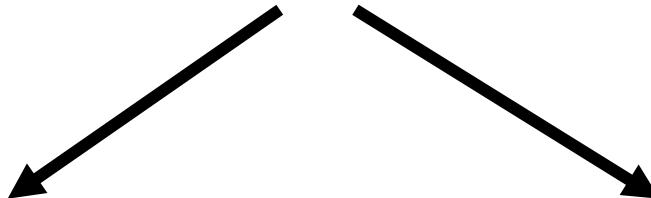
Drug allergy

Immediate



1. Skin test
(intradermal)
2. sIgE ± BAT
3. Provocation

Lab diagnosis in DHR



Acute phase

Immediate type

Tryptase

Delayed type

Eosinophils

ECP

Organ specific
(liver, kidney)

Work-up

Immediate

IgE

Basophil

activation
test (BAT)

Delayed type

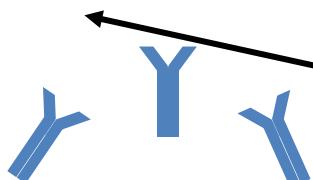
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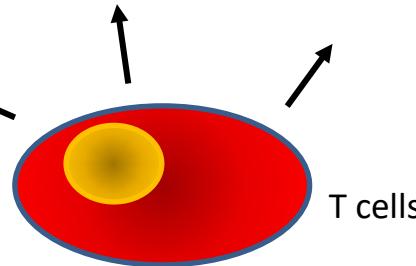
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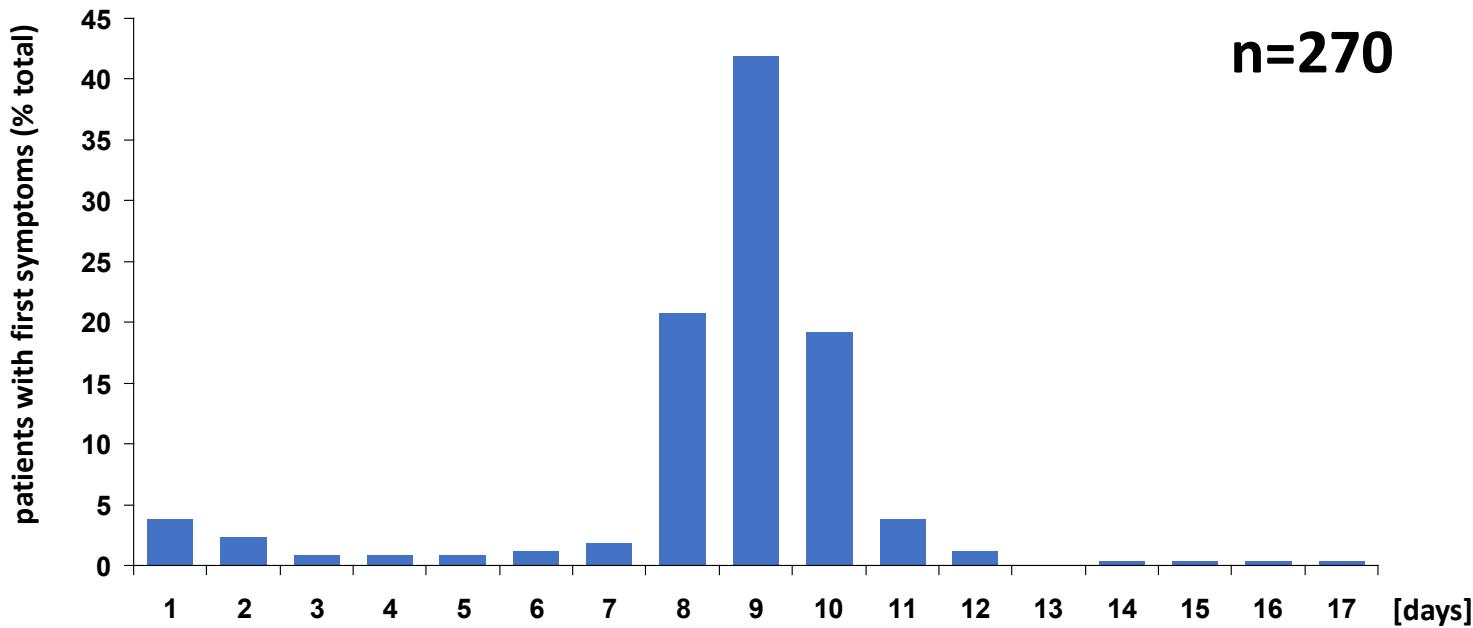
DRESS



SJS/TEN



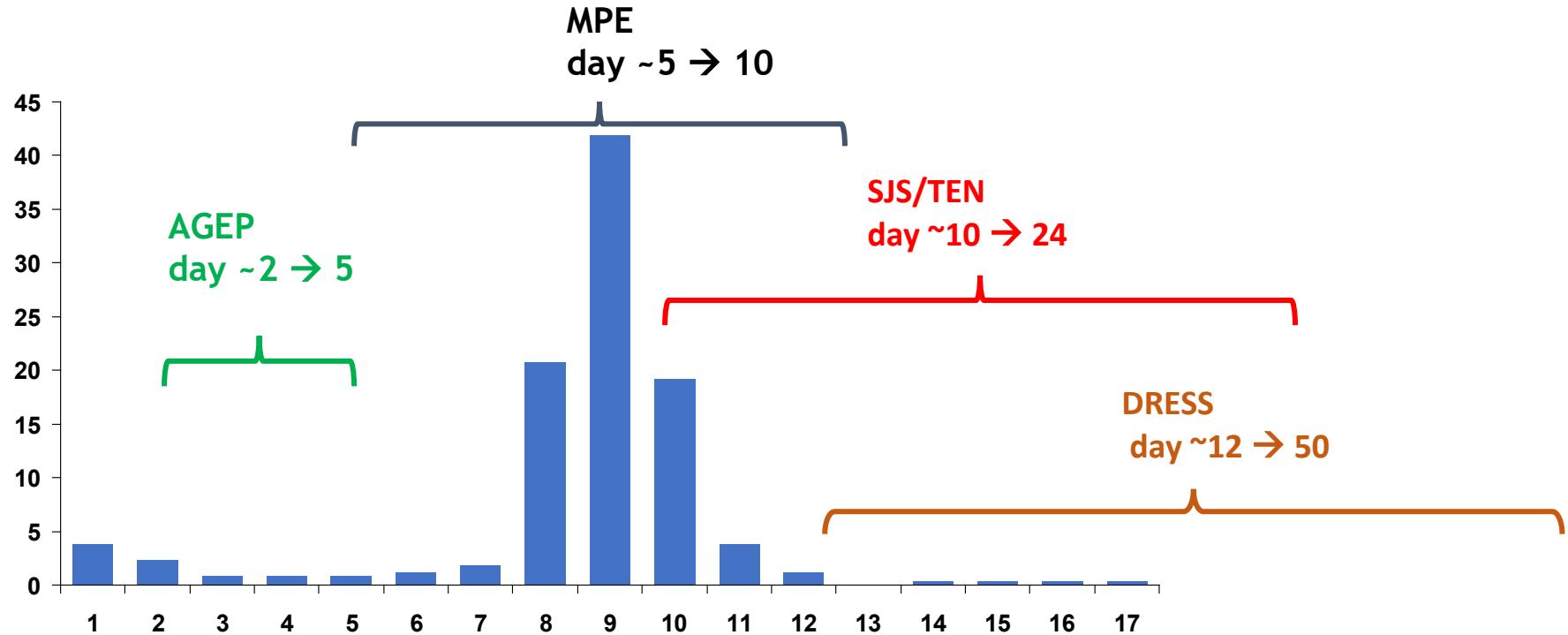
Delayed DHR: How much of a delay?



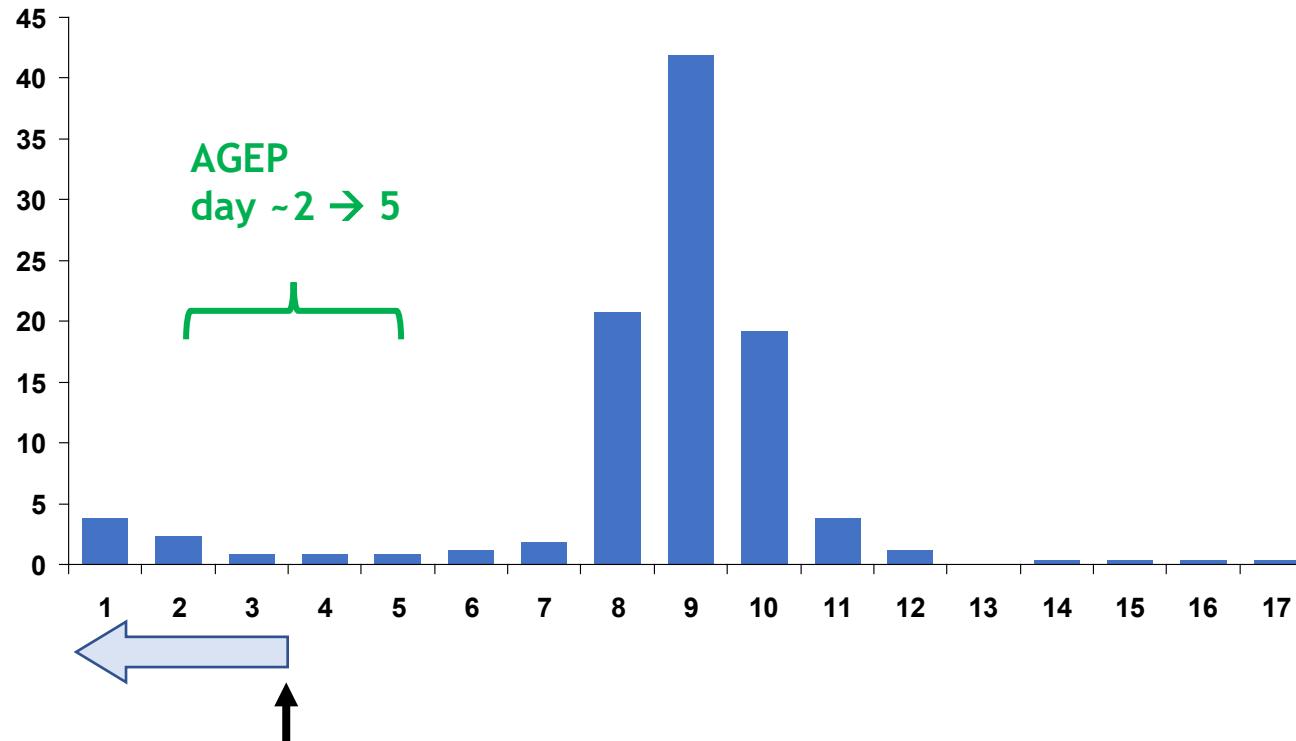
Appearance of first symptoms in delayed DHR to quinolones
(gemifloxacin-treated women, mainly skin rashes)

Curr Pharm Des. 2006;12(26):3313–26

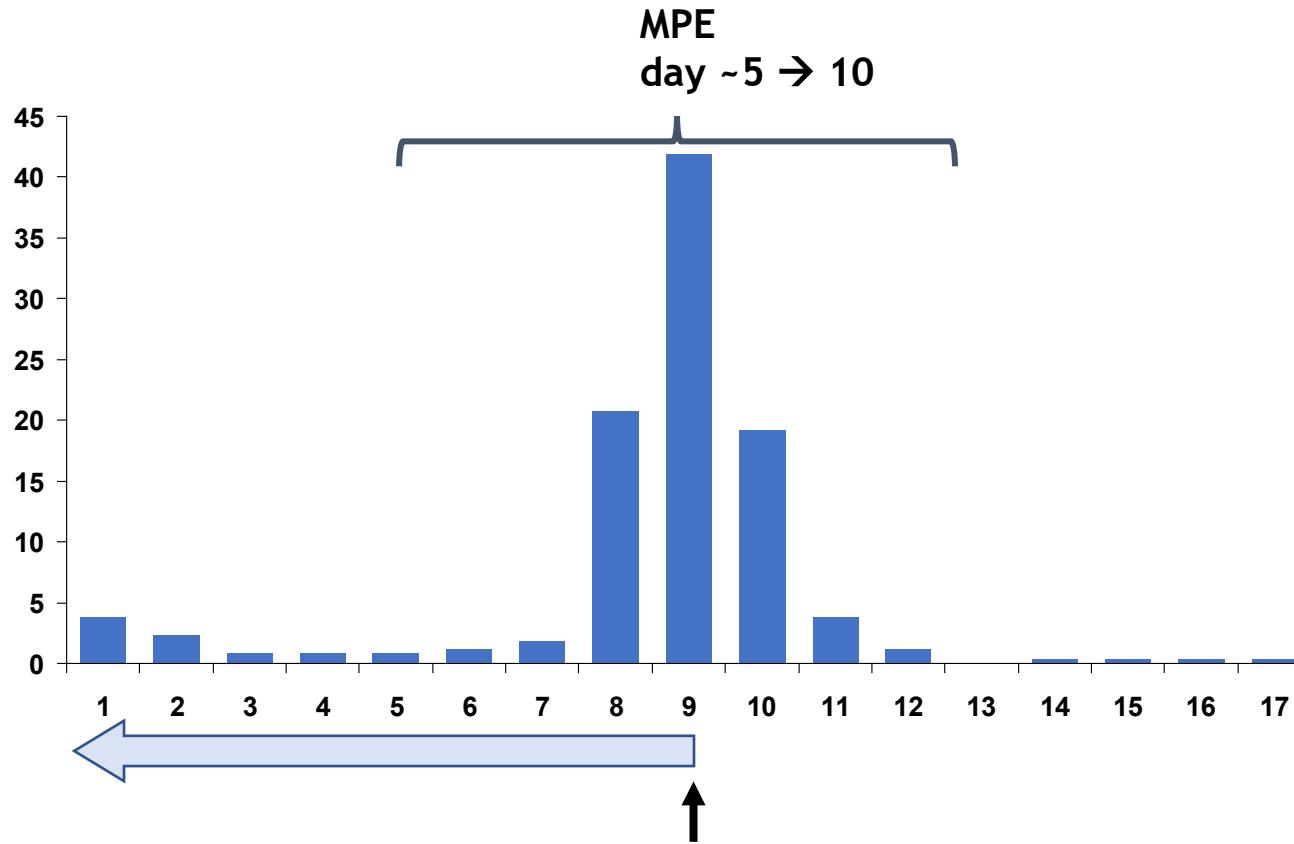
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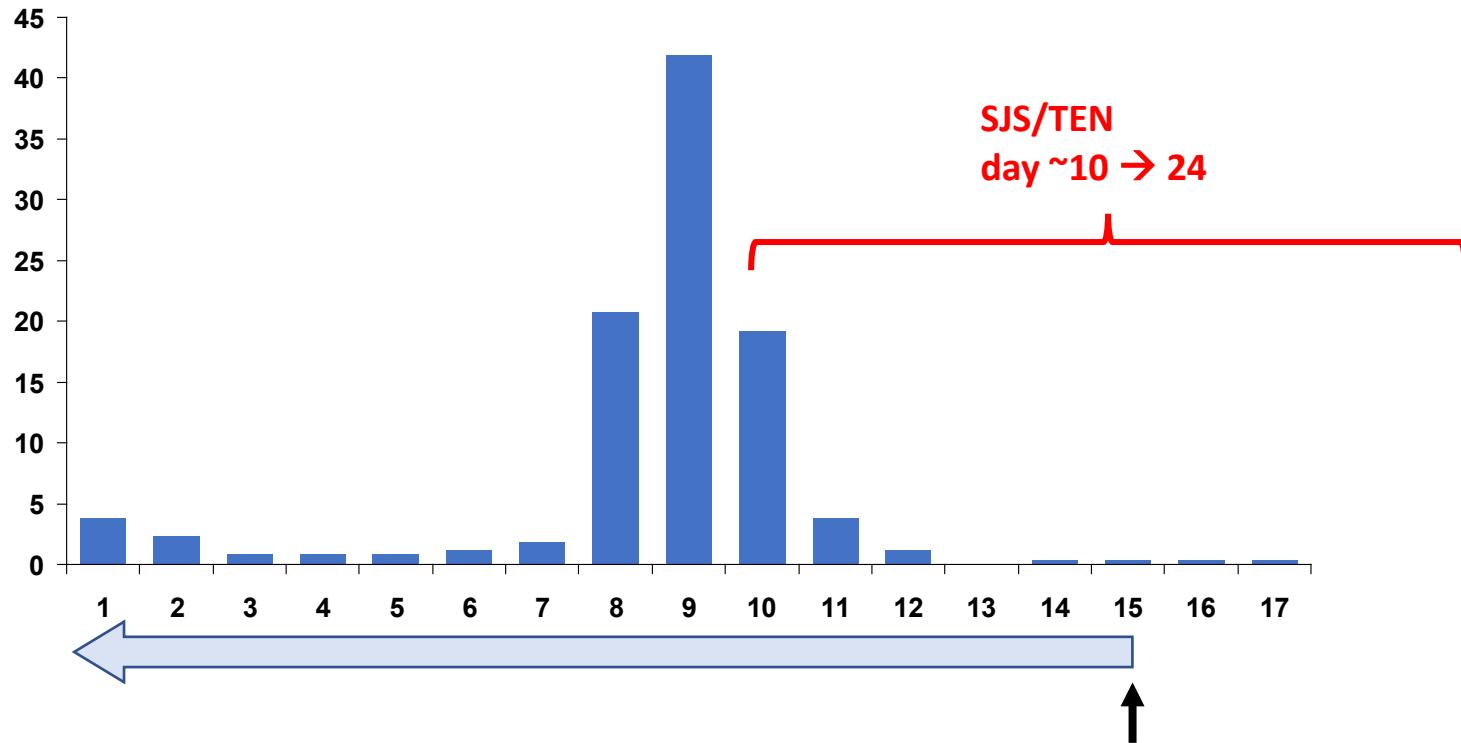
Delayed DHR: How much of a delay?



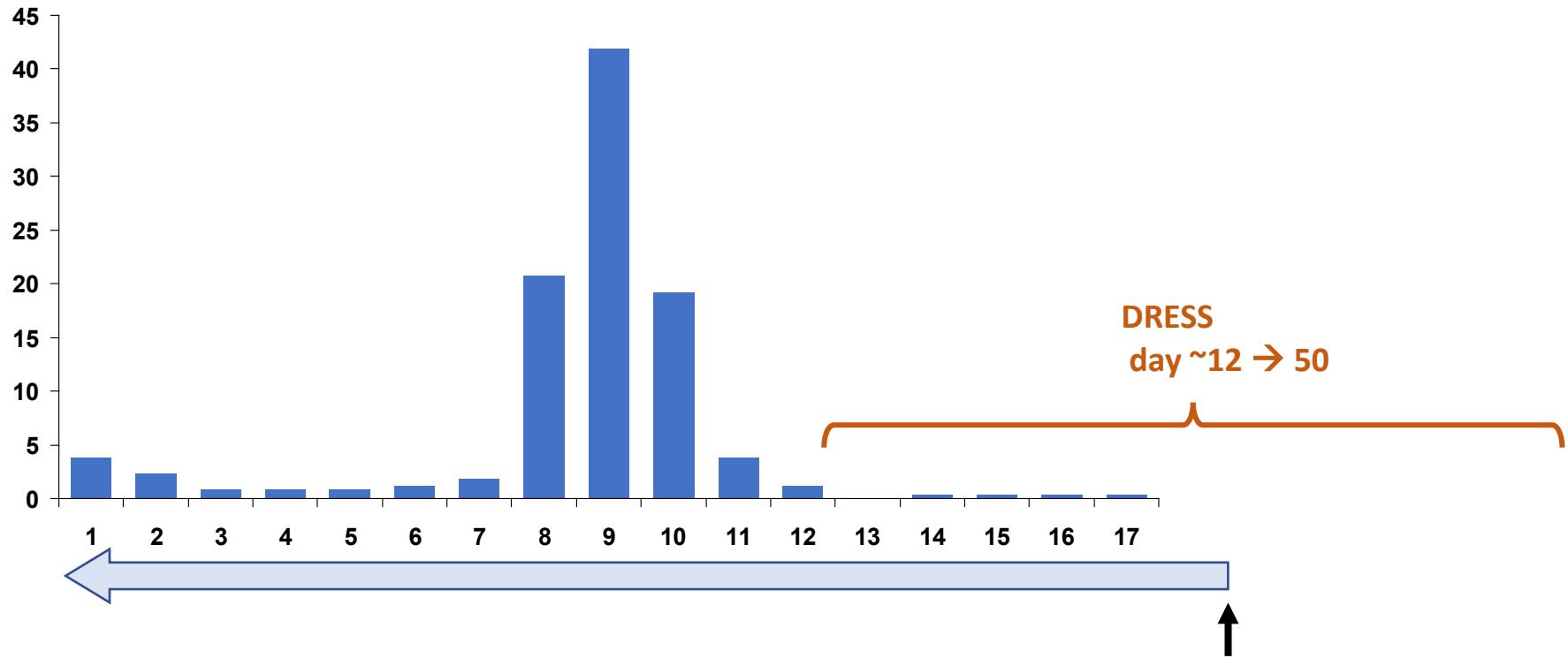
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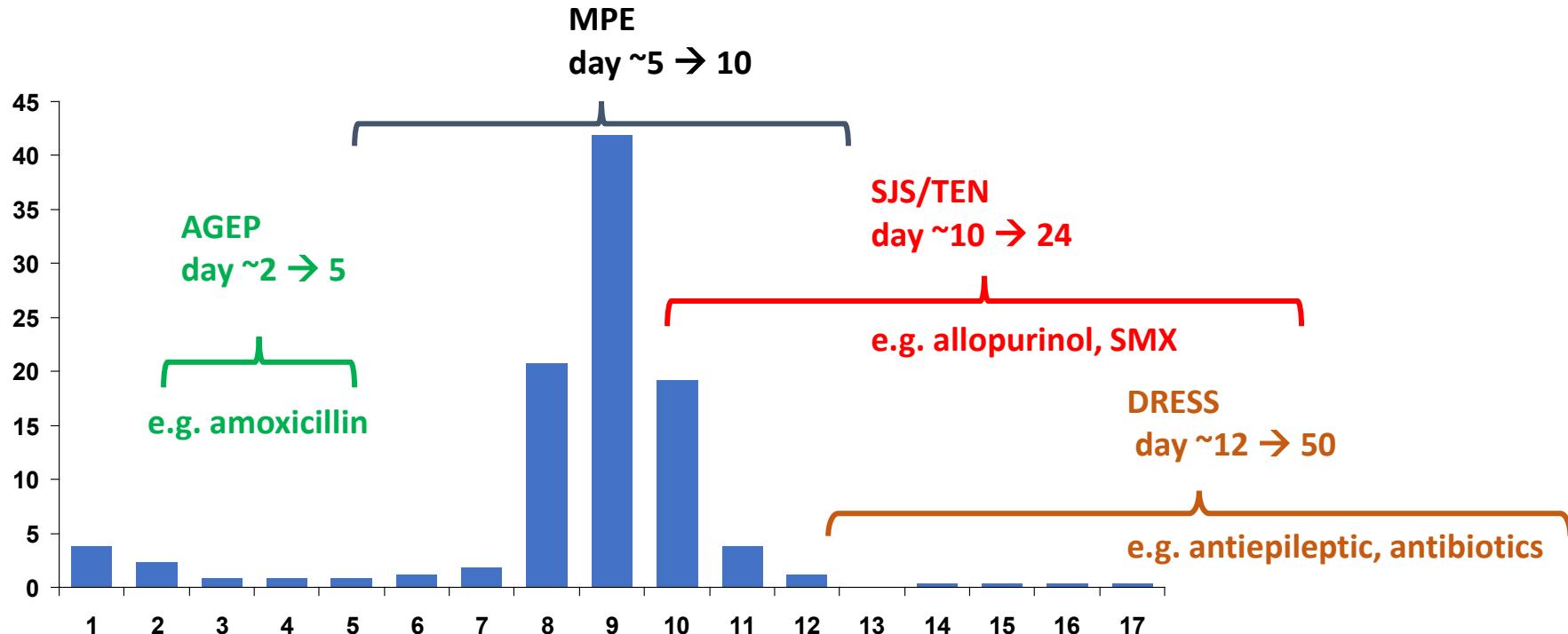
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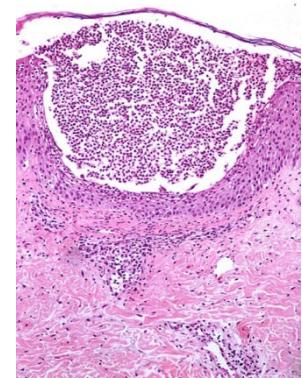
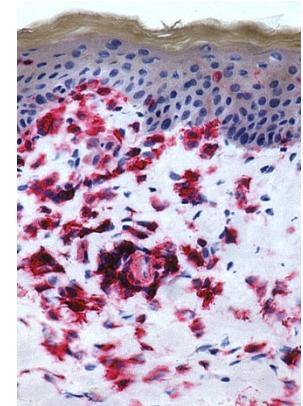
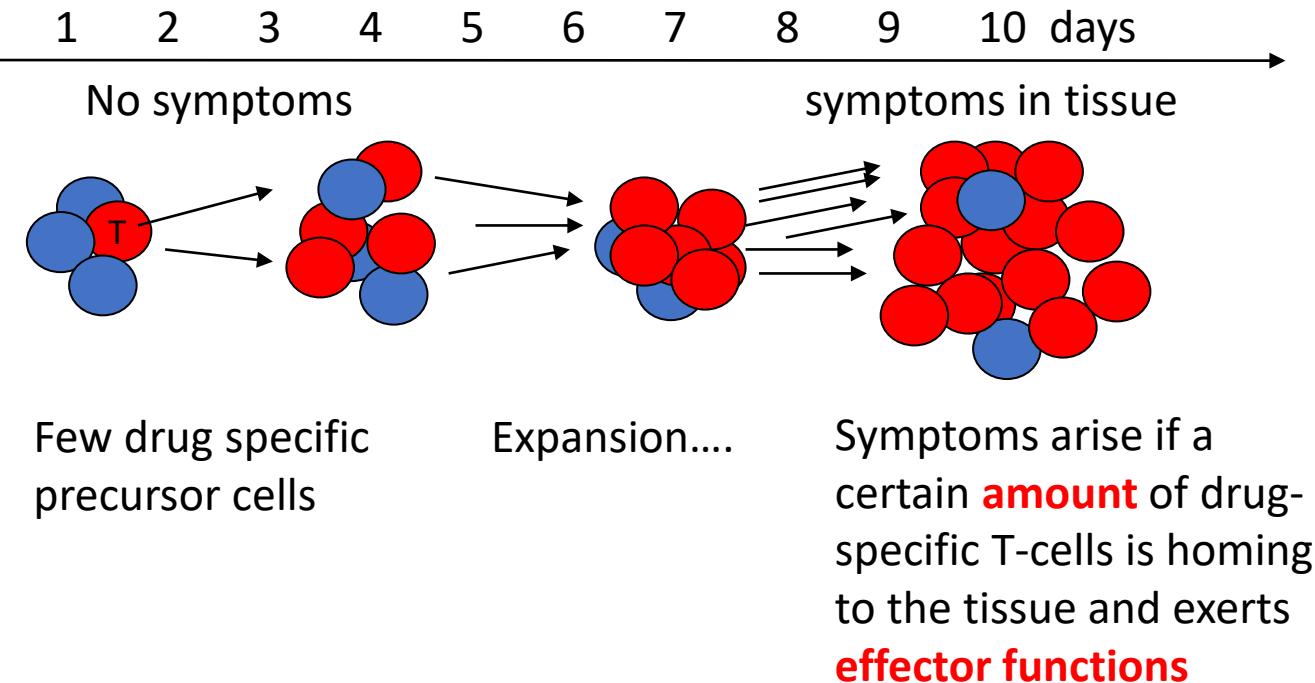
Delayed DHR: How much of a delay?



Delayed DHR: How much of a delay?



Why delayed? T cell mediation



Lymphocyte transformation Test (LTT)

Lymphocyte transformation test (LTT)



LTT practical approach



ca. 680 pure substances with each drug concentration tested for:

1. Cytotoxicity *in vitro*
2. Unspecific proliferation/stimulation *in vitro*

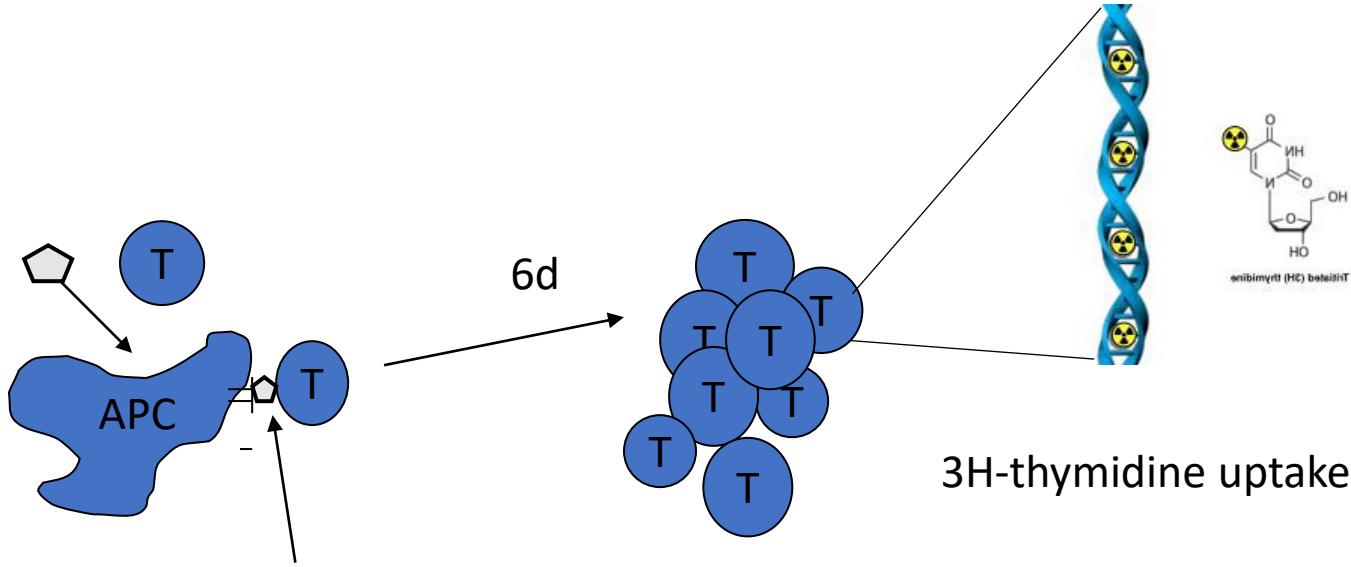
4×10^5 lymphocytes / well in AB serum or autologous plasma

Quadruplicate cultures

3 drugs in 3-4 concentrations typically 0.1 - 1 - 10 - 100 µg/ml

Negative control: medium alone
Positive controls: Pokeweed mitogen (PWM)
Tetanus toxoid (TT)

Read-out proliferation



proliferation-based method

Read-out proliferation



Sensitivity 30-70%

Specificity >90%

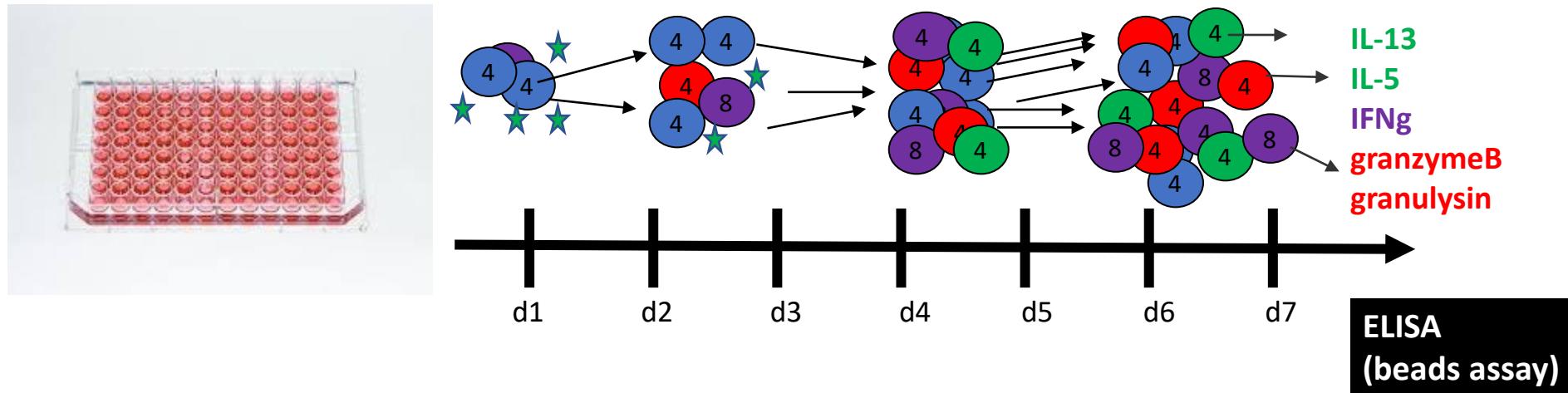
proliferation-based method

Cyto-LTT

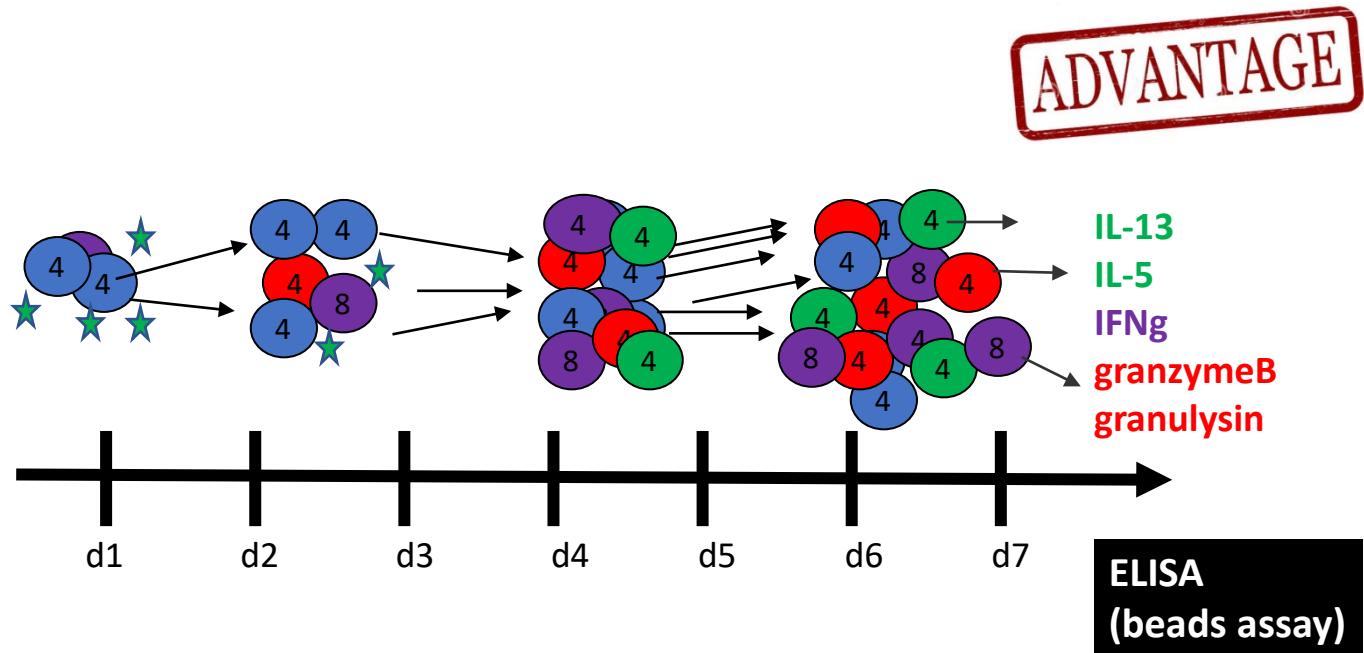
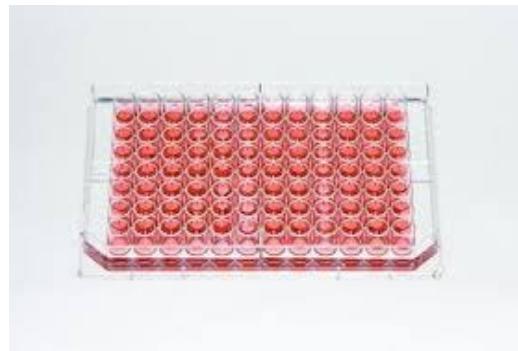
From LTT to Cyto-LTT



From LTT to Cyto-LTT

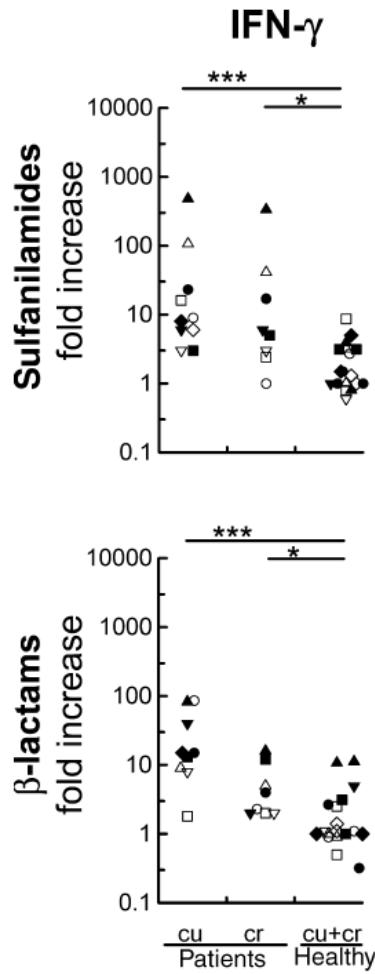


From LTT to Cyto-LTT

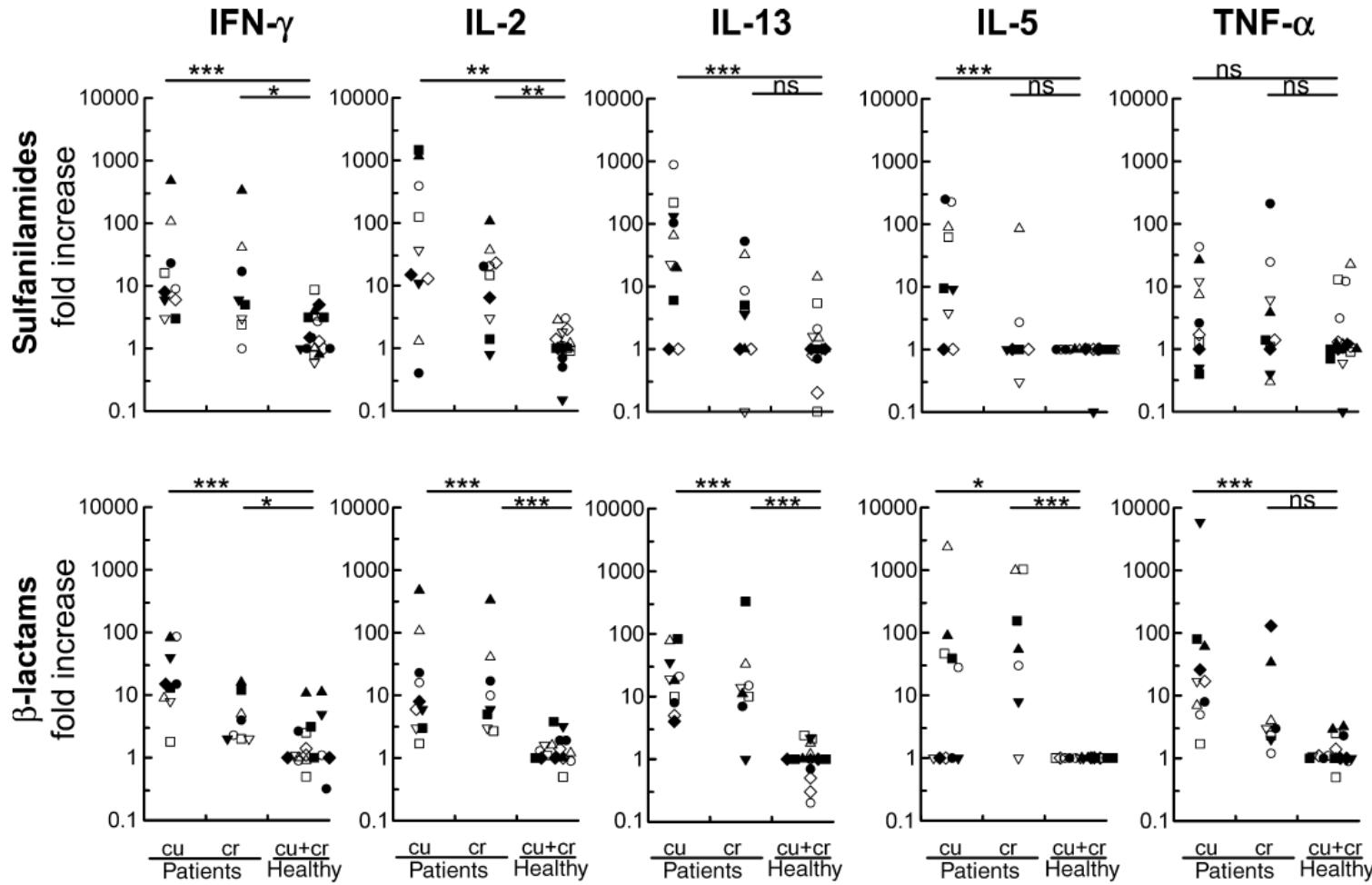


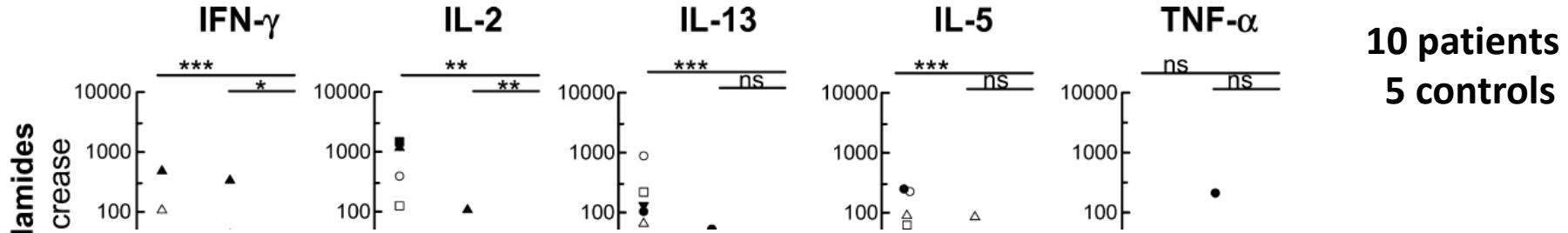
proliferation & cytotoxicity

10 patients
5 controls



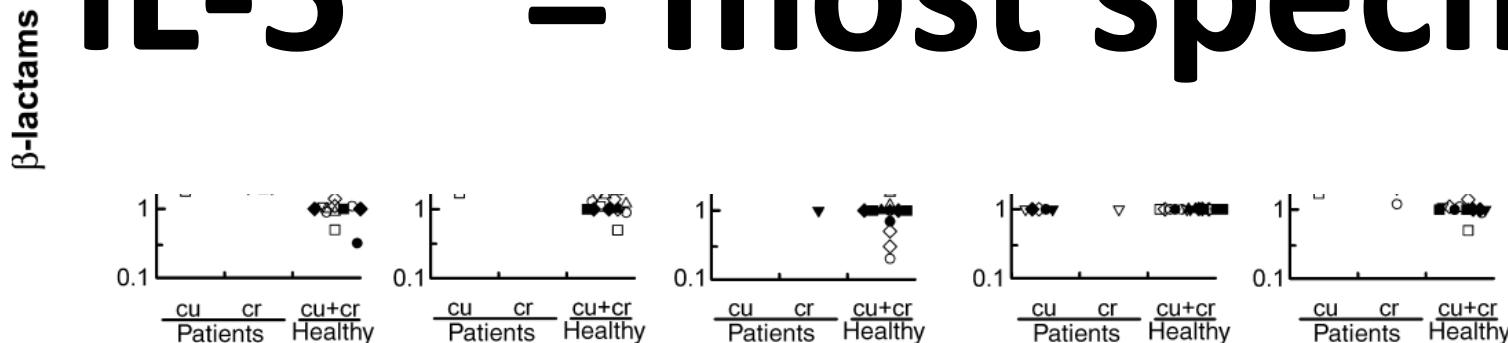
**10 patients
5 controls**





IFN- γ = most sensitive

IL-5 = most specific



Cyto-LTT : stimulation Index (SI)

$$SI = \frac{\text{Conc. with drug}}{\text{Conc. without drug}}$$

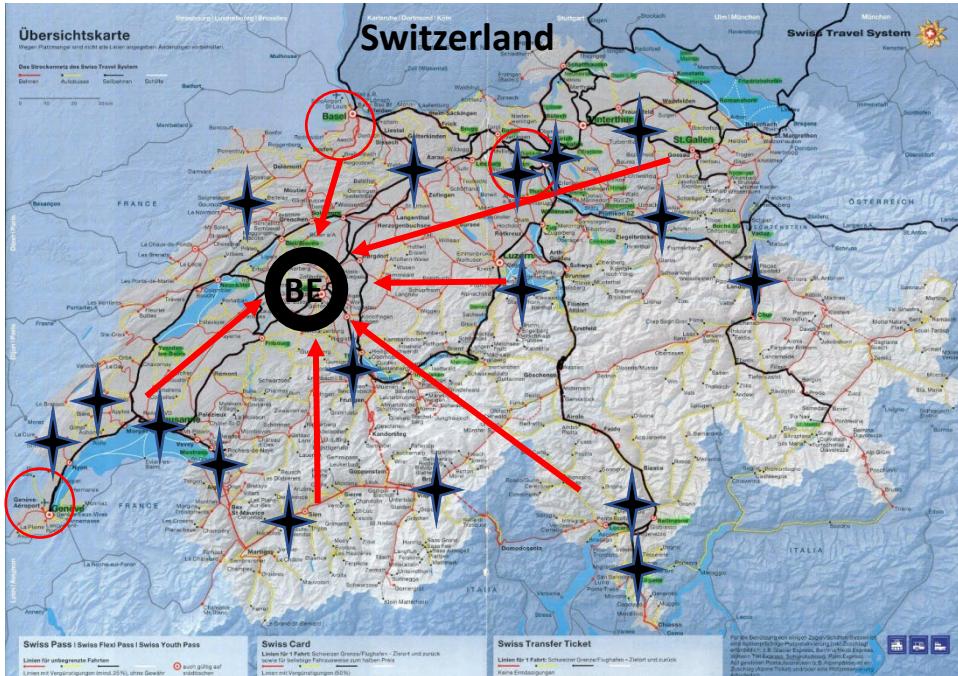
- Low SI: no stimulation by the antigen (drug), no sensitization
- High SI: strong stimulation by the antigen (drug)
- Definition of test positivity:
 - SI > 2** in at least 2 drug concentrations
 - and in at least 2 different cytokines

Important practical aspects for the Cyto LTT

- **680 pure substances** or injection solutions in stock
 - Test concentrations have been evaluated for all of them
Maximum serum concentration is used as starting point
- 1 LTT consists of **13 different cell culture conditions** in triplicate
- Zyro LTT is an individual test with individual control (no standardized absolute values (cytokine concentrations) – comparison between stimulus and control)
- Cytokine measurement:
 - In each condition 5 cytokines are measured.
 - Altogether **65 cytokine measurements** or ELISA per Cyto LTT (70.- per measurement)
 - Multiplex technology
- With the change of informatic system (2023), SI values will be available to prescribing doctors

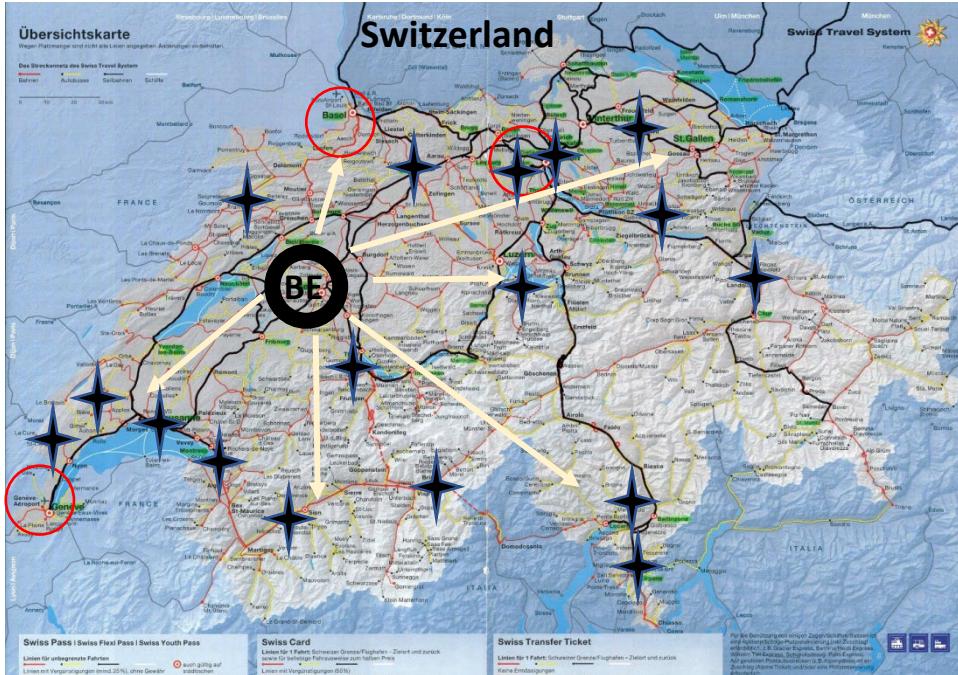
Diagnosis of drug hypersensitivity in CH (8,4 Mio)

- ★ allergologists (~ 100)
- centers with clinical research
- Centralized lab service (ADR-AC)



Cyto LTT report

- ★ allergologists (~ 100)
- centers with clinical research
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Cyto-LTT (SI) severe MPE

Drug (pure)	IL-5	IL-13	IFNg	GzB	GL
Bactrim (SMX+TMP)	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (0)
62,5 µg/ml	1,00	1,00	1,00	1,73	1,04
125 µg/ml	1,11	1,63	1,43	4,54	1,29
250 µg/ml	1,00	1,00	0,99	1,46	1,04
Ciprofloxacin	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (0)
0,1 µg/ml	1,00	1,00	0,99	0,08	1,01
1 µg/ml	1,00	1,00	0,99	0,30	1,29
10 µg/ml	1,00	1,00	1,60	3,12	1,01
Vancomycin HCl	Positiv (2)	Positiv (2)	Positiv (2)	Positiv (3)	Positiv (2)
10 µg/ml	1,00	1,00	0,99	2,49	1,08
100 µg/ml	5,69	6,55	3,94	7,17	2,03
200 µg/ml	4,13	4,35	3,05	7,83	2,63
control					
Pokeweed	Positiv (1)	Positiv (1)	Positiv (2)	Positiv (2)	Positiv (1)
Mitogen	9,19	92,54	18347,43	1840,45	33,35
Tetanus Toxoid	1,00	1,07	8,49	18,98	1,44

Cyto-LTT result form

RESULTAT

Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
Bactrim (SMX+TMP) 62.5/125/250 µg/ml	Negativ	Negativ	Negativ	Negativ	Negativ
Ciprofloxacin 0.1/1/10 µg/ml	Negativ	Negativ	Negativ	Negativ	Negativ
Vancomycin HCl 10/100/200 µg/ml	Positiv	Positiv	Positiv	Positiv	Positiv
Kontrolle Pokeweed Mitogen Tetanus Toxoid	Positiv	Positiv	Positiv	Positiv	Positiv

DRESS with IL-5 dominance

ZyoLTT 1914	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
DRESS, HT negativ	Cefepim 5 µg/ml 50 µg/ml 500 µg/ml	Positiv (2) 6.00 26.97 0.52	Negativ (0) 0.98 1.27 0.98	Negativ (1) 3.58 0.12 0.03	Negativ (0) 0.29 0.09 0.15	Negativ (0) 0.58 0.47 0.17
	Sulfamethoxazol 50 µg/ml 100 µg/ml 250 µg/ml	Negativ (0) 0.61 0.52 0.61	Negativ (0) 0.98 0.98 0.98	Negativ (0) 0.05 0.04 0.03	Negativ (0) 0.37 0.25 0.01	Negativ (0) 0.56 0.63 0.46
	Vancomycin HCl 10 µg/ml 100 µg/ml 200 µg/ml	Positiv (3) 579.52 2644.31 908.25	Positiv (3) 80.80 160.79 103.73	Positiv (3) 3.13 8.62 17.16	Positiv (3) 3.88 56.33 28.53	Positiv (3) 8.38 50.60 48.48
	Kontrolle Pokeweed Mitogen Tetanus Toxoid	Positiv (2) 136.37 324.56	Positiv (2) 168.81 42.88	Positiv (2) 267.30 22.58	Positiv (2) 70.86 10.14	Positiv (2) 29.91 12.59

Exanthem with IFNg dominance

ZyoLTT 2298	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
Exanthem vor Jahren	Amoxicillin / Clavulansäure	Positiv (2) 3.21	Positiv (2) 1.76	Positiv (3) 15.60	Positiv (2) 0.58	Positiv (2) 1.10
HT ?	125 µg/ml	2.27	2.04	22.36	4.57	2.51
	250 µg/ml	0.62	3.67	65.82	8.10	2.20
	500 µg/ml					
	Cefuroxim	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (0)
	1 µg/ml	0.46	0.24	0.42	0.25	1.17
	5 µg/ml	1.07	0.43	0.17	0.04	0.87
	20 µg/ml	0.52	0.94	1.89	0.23	1.06
	Penicillin G	Negativ (0)	Negativ (1)	Negativ (0)	Negativ (0)	Negativ (0)
	50 µg/ml	0.57	0.41	0.36	0.24	1.16
	200 µg/ml	0.27	0.11	0.52	0.06	1.21
	500 µg/ml	1.42	2.39	0.74	0.67	1.18
	Kontrolle					
	Pokeweed Mitogen	Positiv (2) 4.47	Positiv (2) 32.29	Positiv (2) 629.32	Positiv (2) 79.43	Positiv (2) 65.75
	Tetanus Toxoid	23.16	13.00	43.99	4.28	4.82

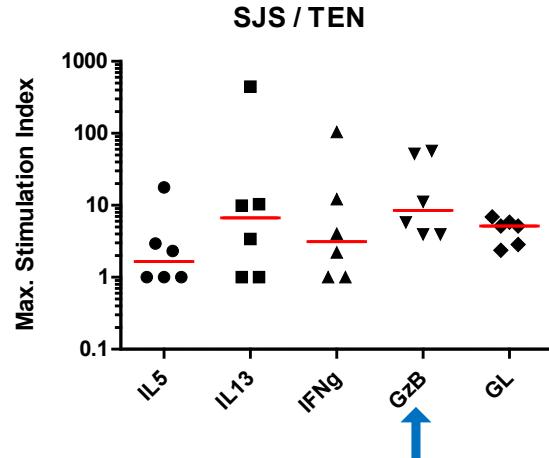
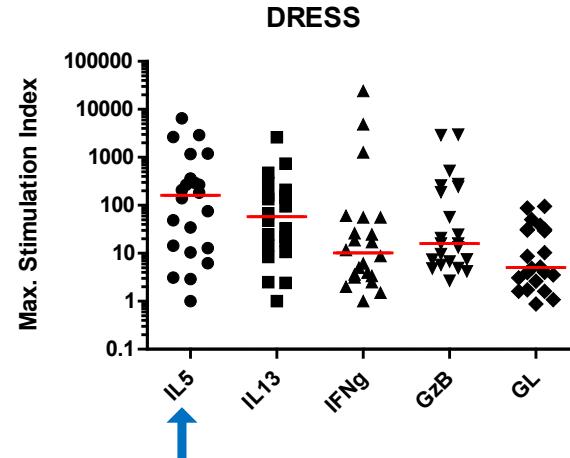
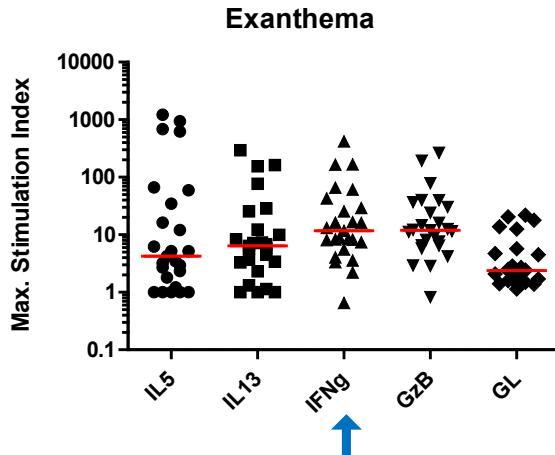
Exanthem with Th2 dominance

ZyoLTT 2252

Über Wochen
persistierendes
Exanthem im
Gesichtsbereich.
Reaktionsdatum 1999;
Hauttests negativ

	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
	Amoxicillin / Clavulansäure	Negativ (0)				
	125 µg/ml	1.03	1.00	0.72	0.24	0.89
	250 µg/ml	1.00	1.00	1.34	1.23	0.81
	500 µg/ml	1.91	1.00	1.85	1.84	0.92
	Cefuroxim	Negativ (0)				
	1 µg/ml	1.00	1.00	1.00	0.87	1.99
	5 µg/ml	1.00	1.00	0.72	0.29	0.85
	20 µg/ml	1.00	1.00	0.72	0.93	0.75
	Penicillin G	Positiv (3)	Positiv (3)	Positiv (2)	Positiv (2)	Negativ (0)
	50 µg/ml	26.20	2.02	0.72	1.82	0.95
	200 µg/ml	114.06	34.80	5.56	7.68	1.03
	500 µg/ml	620.00	155.26	3.47	14.63	1.49
	Kontrolle					
	Pokeweed	Positiv (2)				
	Mitogen	1055.60	468.40	9501.29	1583.57	32.63
	Tetanus Toxoid	133.32	15.45	72.13	96.43	3.39

Cyto-LTT: cytokine patterns



Identification of cross-reactivity to other drugs

	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
ZytoLTT 3451						
Multiformes Exanthem	Esomeprazolum Sodium 0.5 µg/ml 2 µg/ml 10 µg/ml	Positiv (3) 2.26 80.31 79.39	Positiv (2) 1.00 10.75 9.68	Positiv (3) 24.57 6.15 17.29	Positiv (3) 9.01 11.50 44.14	Negativ (0) 1.00 1.00 1.00
Hauttests ?	Pantoprazol 0.5 µg/ml 2 µg/ml 10 µg/ml	Positiv (3) 39.60 61.73 7.67	Positiv (2) 8.83 5.80 1.05	Positiv (2) 19.76 8.37 1.13	Positiv (2) 57.07 24.53 0.76	Negativ (0) 1.00 1.00 1.00
	Paracetamol 1 µg/ml 10 µg/ml 50 µg/ml	Negativ (0) 1.00 1.00 1.00	Negativ (0) 1.00 1.00 1.00	Negativ (1) 47.42 1.43 1.00	Negativ (1) 19.41 1.36 0.43	Negativ (0) 1.00 1.00 1.00
	Kontrolle Pokeweed Mitogen Tetanus Toxoid	Positiv (2) 93.26 23.80	Positiv (1) 107.33 1.27	Positiv (2) 4000.00 8.12	Positiv (2) 370.91 17.97	Negativ (0) 1.00 1.00

Exclusion of cross-reactivity to other drugs

ZyoLTT 3475

Exanthème

Hauttests: ?

	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
	Amoxicillin / Clavulansäure	Positiv (3) 3.71 4.03 3.39	Positiv (2) 2.27 2.29 1.72	Negativ (1) 0.87 2.84 0.82	Positiv (3) 3.71 9.21 3.05	Negativ (0) 1.00 1.00 1.00
	Cefuroxim	Negativ (0) 0.65 0.57 0.57	Negativ (0) 0.74 0.40 0.98	Negativ (0) 0.22 0.22 0.24	Negativ (1) 0.85 0.85 6.11	Negativ (0) 1.00 1.00 1.00
	Torasemid	Negativ (0) 0.57 0.57 0.57	Negativ (0) 0.40 0.43 0.45	Negativ (0) 0.22 0.22 0.22	Negativ (0) 0.85 0.85 0.85	Negativ (0) 1.00 1.00 1.00
	Kontrolle Pokeweed Mitogen Tetanus Toxoid	Positiv (1) 779.80 0.57	Positiv (1) 806.91 0.64	Positiv (1) 673.40 0.36	Positiv (2) 148.02 3.01	Negativ (0) 1.00 1.00

Examples of peculiar cases

SI closed to 2.0 and unclear reactivity

	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
CytoLTT 2300	Lansoprazol	Negativ (0)	Negativ (0)	Positiv (2)	Positiv (2)	Positiv (2)
	0.5 µg/ml	1.00	1.00	3.58	2.86	2.43
	1 µg/ml	1.22	1.00	2.26	2.26	2.37
	5 µg/ml	1.00	1.00	0.97	1.03	1.89
Exanthem	Pantoprazol	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (1)	Negativ (1)
	0.5 µg/ml	1.00	1.00	1.98	1.51	1.75
	2 µg/ml	1.38	1.00	2.85	2.19	2.26
	10 µg/ml	1.38	1.00	0.97	0.75	1.83
Hauttests Pantoprazol +	Rabeprazol	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (0)	Negativ (0)
	0.1 µg/ml	1.00	1.00	2.07	1.77	1.80
	1 µg/ml	1.00	1.00	0.97	0.72	1.59
	5 µg/ml	1.22	1.00	0.97	0.65	1.16
Issues:	Kontrolle	Positiv (2)				
- Low positive values (relevance ?)	Pokeweed Mitogen	3287.60	757.60	8819.38	2122.45	242.82
- Discrepancy with skin testing. Lansoprazole false +?	Tetanus Toxoid	4107.60	112.30	376.21	125.67	11.89
- Cross reactivity with Pantoprazol?						
- Good controls						

SJS/TEN with DRESS hallmarks (IL5 high)

	Reinsubstanzen	IL-5	IL-13	IFNg	GzB	GL
ZyoLTT 3472						
	Amoxicillin	Positiv (4)	Positiv (4)	Negativ (1)	Positiv (2)	Positiv (4)
SJS/TEN, Reaktionsdatum 10/21	62.5 µg/ml	91.15	30.82	1.25	2.57	3.59
	125 µg/ml	87.06	22.18	1.44	2.43	3.70
	250 µg/ml	129.71	25.68	3.09	1.21	6.38
Hauttests negativ	500 µg/ml	55.45	14.45	1.42	1.28	2.72
	Cefuroxim	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (1)
<i>Issues:</i> - High IL5 and IL13 - Cytokine secretion pattern does not fit with the clinic - Relevance?	0.5 µg/ml	1.00	1.00	1.00	1.00	0.63
	1 µg/ml	1.00	1.00	1.00	1.00	0.74
	5 µg/ml	1.00	1.00	1.00	1.00	0.30
	10 µg/ml	1.00	1.17	1.00	1.07	2.46
	20 µg/ml	1.00	1.00	1.00	1.00	0.83
	Kontrolle Pokeweed Mitogen	Positiv (2) 46.33	Positiv (2) 192.13	Positiv (2) 4000.00	Positiv (2) 2453.39	Positiv (2) 648.47
	Tetanus Toxoid	187.54	342.74	4000.00	2453.39	648.47

High background in cytokine secretion leads to reduction of the sensitivity

ZyoLTT 3421

DRESS

20.1.22

Hauttests ?

Issues:

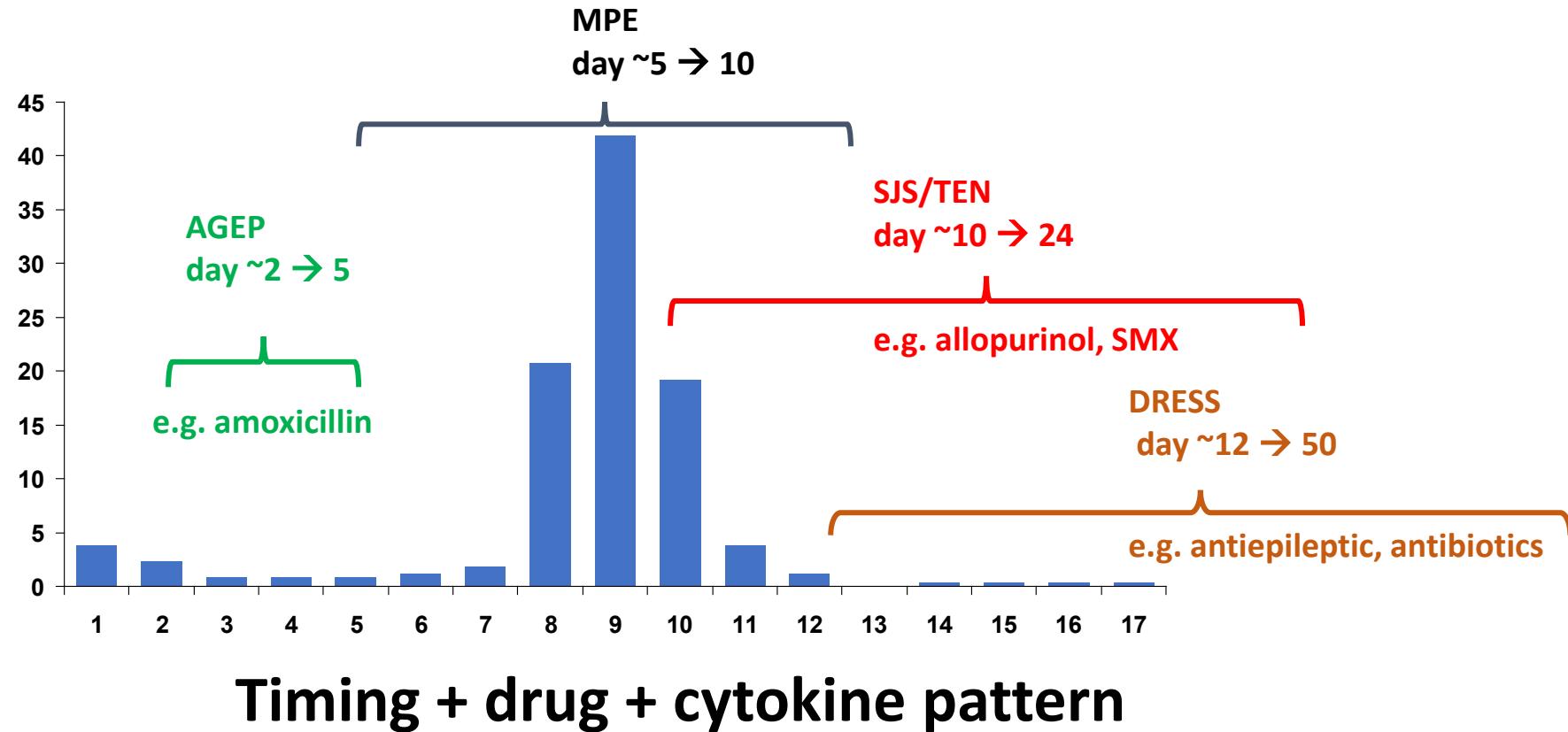
- *High background in neg. Ctrl cultures*
- *Is SI>2 still usefull to interpret such cases.*
- *DRESS: reduction of steroid too abrupt?*
- *Reason for high background: steroid reduction ?, Covid?*
- *Relevance?*

Cytokine		IL-5	IL-13	IFNg	GzB	GL
Normal range of controls		<2.5 [pg/ml]	<2.5 [pg/ml]	<5.0 [pg/ml]	<100 [pg/ml]	<1000 [pg/ml]
Neg controls		226.573	226.092	230.73	6648.48	4199.01
PWM		1213.64	>5000.00	>10000.0	>50000.0	>50000.0
		78.306	82.807	1453.32	8000.11	5616.03
TT						
Gabapentin	0.1	85.453	86.676	239.17	1919.1	3105.87
	1	130.672	88.902	73.95	1447.28	1641.89
	10	107.043	115.575	173.69	2773.88	3556.61
	100	62.752	49.475	66.88	990.53	2384.67
	200	34.497	38.143	76.04	918.85	1738.72
Pregabalin	1	65.254	73.382	81.34	1318.61	2398.02
	5	48.783	59.261	116.83	1436.73	2636.92
	10	37.75	41.105	45.75	541.36	1160.23
	20	50.57	58.102	56.88	981.47	920.35

Cyto-LTT (SI) severe MPE

Drug (pure)	IL-5	IL-13	IFNg	GzB	GL
Bactrim (SMX+TMP)	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (0)
62,5 µg/ml	1,00	1,00	1,00	1,73	1,04
125 µg/ml	1,11	1,63	1,43	4,54	1,29
250 µg/ml	1,00	1,00	0,99	1,46	1,04
Ciprofloxacin	Negativ (0)	Negativ (0)	Negativ (0)	Negativ (1)	Negativ (0)
0,1 µg/ml	1,00	1,00	0,99	0,08	1,01
1 µg/ml	1,00	1,00	0,99	0,30	1,29
10 µg/ml	1,00	1,00	1,60	3,12	1,01
Vancomycin HCl	Positiv (2)	Positiv (2)	Positiv (2)	Positiv (3)	Positiv (2)
10 µg/ml	1,00	1,00	0,99	2,49	1,08
100 µg/ml	5,69	6,55	3,94	7,17	2,03
200 µg/ml	4,13	4,35	3,05	7,83	2,63
control					
Pokeweed	Positiv (1)	Positiv (1)	Positiv (2)	Positiv (2)	Positiv (1)
Mitogen	9,19	92,54	18347,43	1840,45	33,35
Tetanus Toxoid	1,00	1,07	8,49	18,98	1,44

Delayed DHR: diagnostic approach



Cyto-LTT

- ✓ 1-3 substances
- ✓ 50ml heparin blood
- ✓ Transport <24h at RT
- ✓ Courier
- ✓ paid by health insurance
- ✓ CHF 499.-

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www.adr-ac.ch

LTT

Einsender

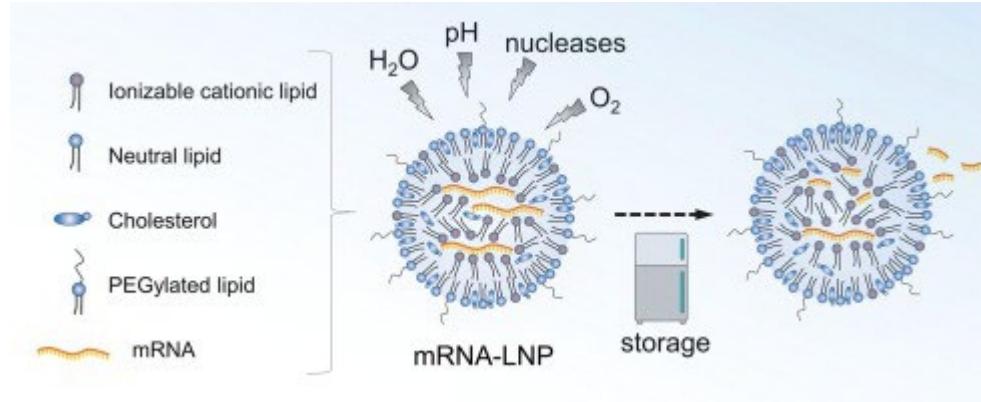
Auftragsbarcode

Patient	LTT	
Name		
Vorname		
Geb.Datum		
Strasse, Nr.		
PLZ	Ort	
EDV-Nr./Pat.ID		<input checked="" type="checkbox"/> W
Tel/Mobile		<input type="checkbox"/> M
Abrechnung		
Versicherung		
Strasse, PLZ/Ort		
Versichertennummer		
<input type="checkbox"/> Kasse/Patient	<input type="checkbox"/> Nicht Kasse	<input type="checkbox"/> Einsender
KVG-Typ		
<input type="checkbox"/> Schwangerschaft	<input type="checkbox"/> Krankheit	<input type="checkbox"/> Unfall
SSW	Tag	
Visum	Entnahmedatum	Entnahmezeit
Befund Kopie		
<input type="checkbox"/> Patient		
<input type="checkbox"/> Arzt/Andere		
Bitte korrekt anstreichen	Material	
<input checked="" type="checkbox"/> Richtig	<input checked="" type="checkbox"/> Falsch	
Heparin		
Klinische Angaben:		
Spättyp-Medikamenten Allergie LTT (Zytokin Lymphozyten Transformationstest)		
<input type="checkbox"/> LTT Spättyp-Medikamenten Allergie Nur nach telefonische Anmeldung Mindestens 50ml Heparin Blut Maximal 20h Transportzeit bei Raumtemperatur	Test-Ansatz (maximal drei Substanzen)*	Hauttestungen
<input type="checkbox"/>	<input type="checkbox"/> pos	<input type="checkbox"/> neg
<input type="checkbox"/>	<input type="checkbox"/> pos	<input type="checkbox"/> neg
<input type="checkbox"/>	<input type="checkbox"/> pos	<input type="checkbox"/> neg
nicht gemacht		
nicht gemacht		
nicht gemacht		
*HINWEIS: Mit einer Blutentnahme werden 2 oder 3 Reinsubstanzen getestet. Wenn nur eine Reinsubstanz angemeldet wird, testen wir ohne Kostenfolge eine therapeutische Alternative mit.		
Kurzanamnese/Symptome:		
Datum der Reaktion:		
Bluteosinophilie:	G/I	
<input type="checkbox"/> Exanthem makulopapulös, makulös, urtiariell		
<input type="checkbox"/> DRESS: Drug Rash with Eosinophilia & Systemic Symptoms		
<input type="checkbox"/> AGEP: Akute generalisierte exanthematische Pustulose		
<input type="checkbox"/> ISJS/TEN: Stevens-Johnson Syndrom/Toxisch epidermale Nekrose		
<input type="checkbox"/> Fixes Arzneimittelexanthem		
<input type="checkbox"/> Kontaktdermatitis		
<input type="checkbox"/> Hepatitis, Nephritis, Pankreatitis		
<input type="checkbox"/> SDRFE: Symmetrical drug-related intertriginous and flexural exanthema		
<input type="checkbox"/> Vaskulitis		
<input type="checkbox"/> andere Symptome:		

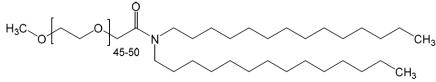
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BAT TO COVID VACCINE

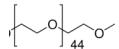
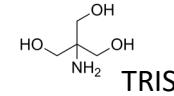
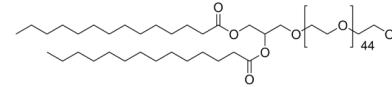
Lipid Nanoparticles LNP



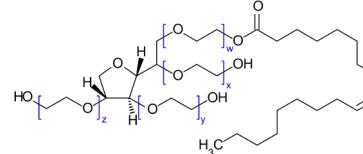
ALC-0159 (2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide)



DMG-PEG2000



PEG-2000



Polysorbate 80

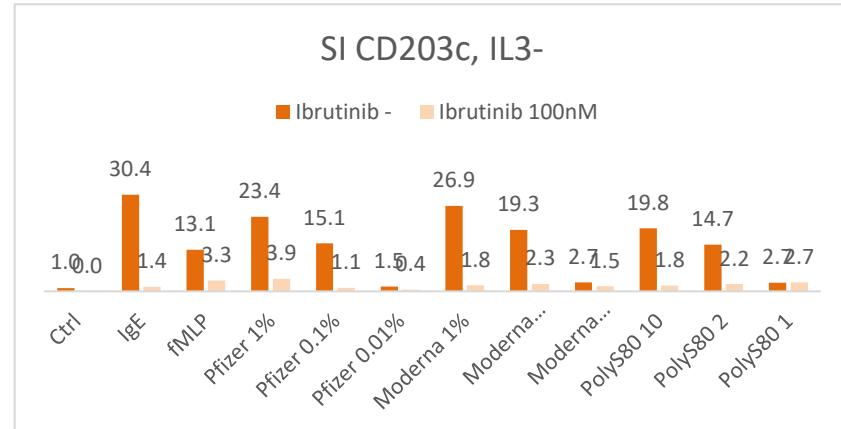
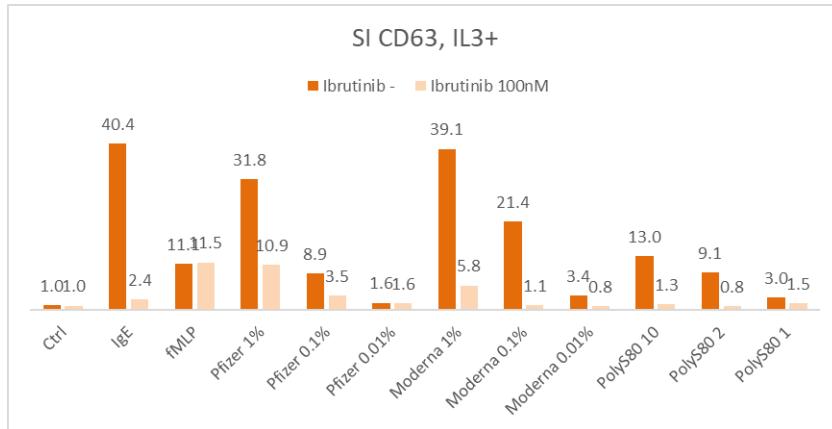
BAT to Covid Vaccines

- BAT wurde gemacht in 24 Individuen mit bestätigter Allergie
 - BAT war positiv in 24 Individuen auf Moderna (Sensitivität 100%)
 - BAT war positiv in 23 Individuen auf Pfizer (Sensitivität ~95%)
- BAT wurde gemacht in 14 Individuen ohne Allergie und ist negativ geblieben
 - Spezifität 100%

Bemerkung: die Daten wurden in Feb-April 2021 gemacht. Bevor die ganze Population exponiert worden ist. Wahrscheinlich ist jetzt die «wahre» Spezifität tiefer, obwohl es ein spezifischer Test bleibt

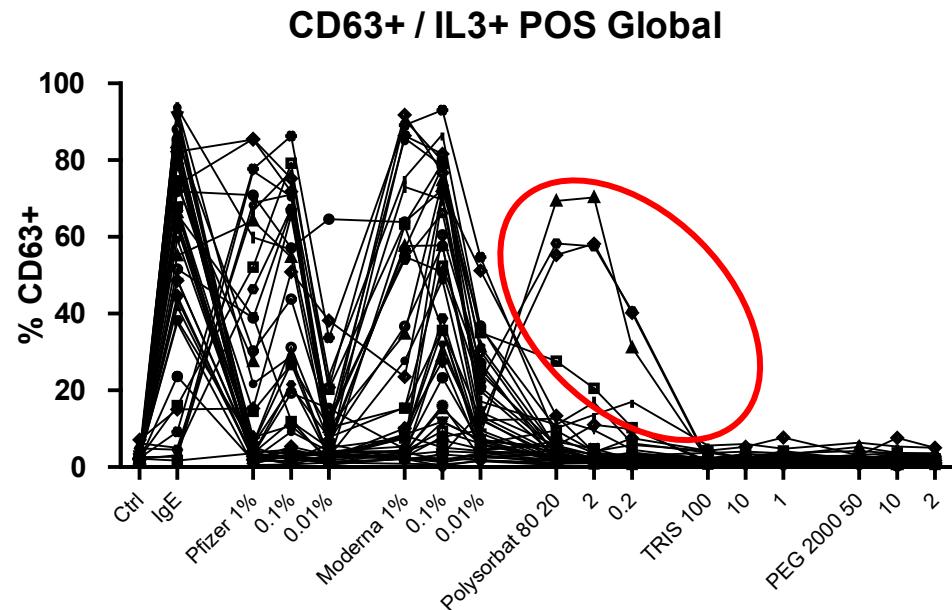
Allergy to Covid vaccine is mediated by IgE

→ Assay in the presence of Ibrutinib inhibit Fc ϵ RI signaling



Controverse : Urticaria 10 days after the boost

- 45 positive BAT since Nov 21
- 7 cases analyzed by BAT with «delayed urticaria»
- 10 days after injection
 - Immediate type???
- BAT very high values
 - Immediate type!
- High prevalence of high SI values for Polysorbate 80
 - 4 cases out of 7



Drug allergy

Immediate

-
- ```
graph TD; A[Immediate] --> B["1. Skin test
(intradermal)"]; B --> C["2. sIgE ± BAT"]; C --> D["3. Provocation"]
```
1. Skin test  
(intradermal)
  2. sIgE ± BAT
  3. Provocation

# Drug allergy

## Immediate

1. Skin test  
(intradermal)
2. sIgE ± BAT
3. Provocation

## Delayed

1. Skin test  
(i/d, epicutaneous)
2. Cyto-LTT
3. ( Provocation )

# Drug allergy

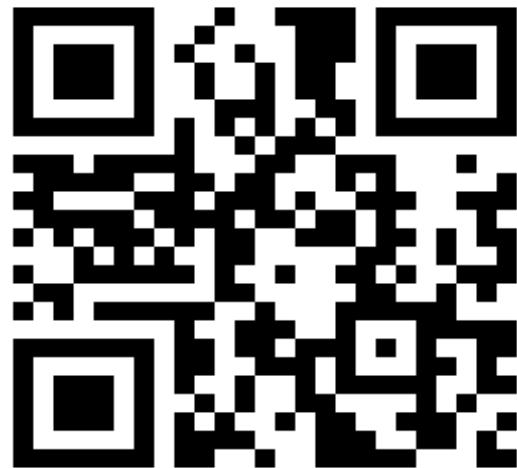
## Immediate

1. Skin test  
(intradermal)
2. sIgE ± BAT
3. Provocation

## Delayed

1. Skin test  
epicut  
i/d
2. Cyto-LTT
3. ( Provocation )

# More details



# Desired case discussion

# SJS/TEN Test cutané non effectué.

Male, Sept 1066

Cyto LTT 1: 8.11.2021

2935

| Reinsubstanzen             | IL-5               | IL-13              | IFNg               | GzB                | GL                 |
|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Bactrim (SMX + TMP)</b> | <b>Positiv (3)</b> |
| 62.5 µg/ml                 | 100.94             | 194.86             | 91.06              | 351.99             | 5.44               |
| 125 µg/ml                  | 170.26             | 328.18             | 86.00              | 552.80             | 4.79               |
| 250 µg/ml                  | 152.23             | 314.86             | 76.82              | 462.00             | 5.79               |
| <b>Ciprofloxacin</b>       | <b>Negativ (0)</b> |
| 5 µg/ml                    | 1.00               | 1.00               | 1.00               | 1.00               | 0.53               |
| 10 µg/ml                   | 1.00               | 1.00               | 1.00               | 1.00               | 0.65               |
| 20 µg/ml                   | 1.00               | 1.00               | 1.00               | 1.00               | 0.56               |
| <b>Ertapenem</b>           | <b>Negativ (0)</b> |
| 10 µg/ml                   | 1.00               | 1.00               | 1.00               | 1.00               | 0.52               |
| 50 µg/ml                   | 1.00               | 1.00               | 1.00               | 1.00               | 0.88               |
| 100 µg/ml                  | 1.00               | 1.00               | 1.00               | 1.00               | 1.01               |
| <b>Kontrolle</b>           |                    |                    |                    |                    |                    |
| <b>Pokeweed Mitogen</b>    | <b>Positiv (1)</b> |
| Tetanus Toxoid             | 120.57             | 506.40             | 20129.20           | 42956.00           | 1716.24            |
|                            | 1.00               | 1.00               | 1.00               | 1.00               | 0.49               |

# SJS/TEN Test cutané non effectué.

Male, Sept 1066

Cyto LTT 2: 22.11.2021

2975

| Reinsubstanzen              | IL-5               | IL-13              | IFNg               | GzB                | GL                 |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Esomeprazolum Sodium</b> | <b>Positiv (3)</b> | <b>Positiv (2)</b> | <b>Negativ (1)</b> | <b>Negativ (1)</b> | <b>Negativ (1)</b> |
| 0.5 µg/ml                   | 2.04               | 1.00               | 1.00               | 0.99               | 0.24               |
| 2 µg/ml                     | 7.18               | 3.04               | 1.00               | 1.98               | 0.57               |
| 10 µg/ml                    | 6.41               | 15.00              | 2.15               | 7.90               | 2.69               |
| <b>Metoprolol</b>           | <b>Negativ (0)</b> |
| 0.05 µg/ml                  | 1.00               | 1.00               | 1.00               | 0.65               | 0.13               |
| 0.1 µg/ml                   | 1.00               | 1.00               | 1.00               | 0.70               | 0.24               |
| 0.2 µg/ml                   | 1.00               | 1.00               | 1.00               | 0.65               | 0.20               |
| <b>Torasemid</b>            | <b>Negativ (1)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> |
| 1 µg/ml                     | 1.00               | 1.00               | 1.00               | 1.09               | 0.33               |
| 10 µg/ml                    | 2.99               | 1.00               | 1.00               | 0.99               | 0.18               |
| 50 µg/ml                    | 1.00               | 1.00               | 1.00               | 0.61               | 0.53               |
| <b>Kontrolle</b>            |                    |                    |                    |                    |                    |
| <b>Pokeweed Mitogen</b>     | <b>Positiv (1)</b> |
|                             | 104.30             | 410.40             | 32362.40           | 5000.47            | 943.84             |
| <b>Tetanus Toxoid</b>       | 1.00               | 1.00               | 1.00               | 1.30               | 0.48               |

# SJS/TEN Test cutané non effectué.

Male, Sept 1066

Cyto LTT 2: 30.11.2021

2996

| Reinsubstanzen          | IL-5               | IL-13              | IFNg               | GzB                | GL                 |
|-------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Gentamycin Sulf.</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (1)</b> |
| 1 µg/ml                 | 1.38               | 1.00               | 0.92               | 1.06               | 0.96               |
| 10 µg/ml                | 1.00               | 1.00               | 0.89               | 1.16               | 1.04               |
| 100 µg/ml               | 1.49               | 1.00               | 0.96               | 0.71               | <b>2.42</b>        |
| <b>Metamizol</b>        | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (0)</b> | <b>Negativ (1)</b> |
| 1 µg/ml                 | 1.62               | 1.00               | 0.79               | 0.77               | 0.67               |
| 10 µg/ml                | 1.74               | 1.00               | 0.82               | 0.84               | 0.83               |
| 50 µg/ml                | 1.00               | 1.00               | 0.96               | 0.68               | <b>2.57</b>        |
| <b>Vancomycin HCl</b>   | <b>Negativ (0)</b> |
| 10 µg/ml                | 1.74               | 1.00               | 1.00               | 1.03               | 0.39               |
| 100 µg/ml               | 1.00               | 1.00               | 1.47               | 0.59               | 0.66               |
| 200 µg/ml               | 1.15               | 1.00               | 0.79               | 0.77               | 0.51               |
| <b>Kontrolle</b>        |                    |                    |                    |                    |                    |
| <b>Pokeweed Mitogen</b> | <b>Positiv (1)</b> |
|                         | <b>126.49</b>      | <b>254.97</b>      | <b>11244.35</b>    | <b>3529.37</b>     | <b>4242.96</b>     |
| <b>Tetanus Toxoid</b>   | 1.00               | 1.01               | 1.00               | 0.93               | 0.83               |