On the Tissue Eosinophil Cells

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On the subject of the circulating eosinophil cells in the blood there have been many researches carried on, but little data have been published referring to the infiltration of the eosinophil cells into some other organs. According to Tadokoro and others (1953) and Shibata (1953), when 2 grams of ACTH a day was administered into the abdominal cavity of a rat for three days or 5 grams of cortisone a day was injected subcutaneously, the lymphatic tissue, particularly the thymus retracted strongly and the eosinophil cells increased markedly into the formation of an aggregation. Elert (1953) found that when he, having a blister rise on the skin of the animal with cantharidin, administered ACTH or adrenalin into the liquor espipatious, the eosinophil cells increased in number. In view of this fact he states that the eosinopenia in the blood is caused by the migration of some parts of the eosinophil cells from the blood vessels and settling into the tissue.

Romani (1952, 1953, 1954), however, reports that the abscess of eosinophil cells or their exudation into the peritoneum, lymph node or thymus could be checked with cortisone and Gross and others (1954) also state that eosinophil cells in the thymus decreased with ACTH in just the same way as those in the blood do, so it can hardly decide that they intensify the migration of eosinophil cells.

Therefore G. Jimbo and his co-workers: Y. Takeda, K. Takeda, H. Sekida, K. Sekida, K. Kimura, H. Kaneko, T. Arita, S. Kagawa and B. Takesue have investi-

Table 1. The organs examined and the number of tissue eosinophil cells in control mouse

organ \ number of the test animals	1	2	3	4	5	6	7	8	9	10	11	12	13
Spleen	0	0	2	2	0	3	0	1	1	0	0	0	0
liver	0	1	0	1	1	1	0	0	2	0	0	0	0
heart	0	0	0	0	0	0	0	0	0	0	0	0	0
kidney	0	1	0	2	2	0	0	0	0	0	0	0	0
lung	0	0	0	1	0	1	0	0	2	0	0	0	0
skin	0	0	0	1	1	1	1	3	0	1	0	0	0
pylorus	0	0	0	2	2	1	1	1	1	1	1	0	1
stomach	1	0	1	4	2	2	0	3	1	1	1	0	1
small intestine	0	1	0	1	1	1	0	0	3	0	0	0	0
vein wall	0	1	0	1	0	0	1	0	0	0	0	0	0
artery wall	0	0	1	0	0	0	0	1	0	0	0	0	0

gated referring to the infiltration of eosinophil cells into other organs and their vicissitudes under various condition.

We gave the mice penicillin, ferric glucuronate (gluferricon), streptomycin, achromycin, acetylcholine (obisot), diphtheria toxoid, diphtheria antitoxin, carzinophilin, zarkomycin, sodium sulfide, sodium salicylate or salvarsan. Besides, we applied ultrasonic waves on mice, soaked mice in Yuda hotspring and let them fall in acidosis or alkalosis.

(1) Cardia and pylorus of stomach

Table 2. The tissue eosinophil count in cardia of mice

drug \ day	1	2	3	5	7	10
penicillin	28	29		29		30
gluferricon	12	18		32	19	
streptomycin	10	14		23		16
achromycin	15	20		18		6
obisot	4		20			
diphtheria toxoid	8		15	5	3	
diphtheria antitoxin	5		6	7	10	
carzinophilin	2.6	7.8	14.3	1.25		
zarkomycin	4.2	2.2	6.4	2		
sodium sulfide	6.4	11	5	3.4		
sodium salicylate	3.4	27.5	1.3	1.1		
salvarsan	3		7	5	1	
acidosis	4		5	3	1	
alkalosis	2		7	4	1	
Yuda hotspring			2	2	1	
ultrasonic wave	6	1	1	1	1	

Table 3. The tissue eosinophil count in pylorus of mice

drug \ day	1	2	3	5	7	10
penicillin	5	8		8		13
gluferricon	1	2		18	11	
streptomycin	9	16		16		11
achromycin	10	13		10		3
diphtheria toxoid	8		9	4	3	
diphtheria antitoxin	2		3	5	6	
carzinophilin	1.2	1.16	1.33	0.5		
zarkomycin	1.2	1.4	1.2	0.6		
sodium sulfide	1	3	2.2	1.2		
sodium salicylate	0.4	9.1	1	0.9		
salvarsan	1		2	1	0	
acidosis	0		1	1	0	
alkalosis	2		3	2	1	

Generally speaking, the eosinophil cells in the lamina propria mucosae tendend to increase in number day by day, showing their maximum on the 3rd day, and then began to decrease by degree, reaching their normal level on the 7th day. Particularly in the mouse which had been administered penicillin, streptomycin or achromycin, densely did eosinophil cells appear and the effects remained as long as 7 days. To the mouse administered ferric glucuronate (gluferricon), too, eosinophil cells appeared

densely and the effects persisted long, but in the diphtheria antitoxin administered mouse, however, even after 7 days its increasing tendency was still observed. Besides, in the case of the pylorus, similar tendency was observed as well.

(2) Skin

Table 4. The tissue eosinophil count in skin of mice

drug \ day	1	2	3	5	7	10
penicillin	11	12		6		6
gluferricon	3	5		10	2	
streptomycin	1	3		5		3
achromycin	2	3		2		1
diphtheria toxoid	2		8	1	3	
diphtheria antitoxin	0		1	3	4	
carzinophilin	1.6	2.36	2.83	0.75		
zarkomycin	2	6.6	7.2	1.2		
sodium sulfide	10.4	16.2	6	1		
sodium salicylate	0.4	1	2	0.9		
salvarsan	0		0	0	0	
acidosis	1		2	1	0	
alkalosis	1		6	5	0	

In the corium of the skin the eosinophil cells tended to increase in number day after day, showing their maximum on the 3rd day, then began to decrease gradually, recovering nearly their normal level on the 7th day. Particularly in the penicillin-administered mouse there densely appeared eosinophil cells and the effects remained as long as 7 days.

(3) Small intestine, spleen, artery wall and vein wall

The eosinophil cells in the lamina propria mucosae of small intestine, spleen, artery wall and vein wall acted intermediately upon the various stimuli, nearly recovering their normal level on the 7th day. In the diphtheria antitoxin administered mouse, however, the number of eosinophil cells was observed to increase by degrees even after 7 days.

Table 5. The tissue eosinophil count in small intestine of mice

drug \ day	1	2	3	5	7	10
penicillin	7	12		1		1
gluferricon	0	1		2	1	
streptomycin	2	3		3		1
achromycin	4	5		1		1
diphtheria toxoid	0		5	1	0	
diphtheria antitoxin	0		0	4	8	
carzinophilin	0.8	1.33	0.66	0.75		
zarkomycin	2	3	3.2	1.2		
sodium sulfide	0.4	0.2	0	0.2		
sodium salicylate	1.1	0.2	0.3	0.4		
salvarsan	0		0	0	0	
acidosis	0		0	0	0	
alkalosis	1		3	0	0	

Table 6. The tissue eosinophil count in spleen of mice

drug \ day	1	2	3	5	7	10
penicillin	1	1		0		0
gluferricon	0	0		0	0	
streptomycin	0	2		1		1
achromycin	0	1		0		0
obisot	2		4			
diphtheria toxoid	0		0	0	0	
diphtheria antitoxin	1		1	1	1	
carzinophilin	1	2	2	0.5		
zarkomycin	0.8	2.8	4	0.6		
sodium sulfide	0	3.2	1	1		
sodium salicylate	0.4	2.3	4	1		
salvarsan	1		2	1	0	
acidosis	1		2	1	0	
alkalosis	1		3	1	1	
Yuda hotspring	0		0	0	0	
ultrasonic wave	5		0	0	0	

Table 7. The tissue eosinophil count in artery wall of mice

drug \ day	1	2	3	5	7	10
penicillin	1	15		8		0
gluferricon	1	1		3	21	
streptomycin	2	1		1		1
achromycin	4	5		1		1
diphtheria toxoid	0		0	0	0	
diphtheria antitoxin	0		0	1	2	
carzinophilin	0.2	1	0.83	0		
zarkomycin	1	2.6	1.2	0.2		
sodium sulfide	0.2	3.4	2.2	1.2		
sodium salicylate	1.1	1.1	0.8	0.9		
salvarsan	0		0	0	0	
acidosis	0		1	0	0	
alkalosis	0		0	0	0	

Table 8. The tissue eosinophil count in vein wall of mice

drug \ day	1	2	3	5	7	10
penicillin	3	3		1		0
gluferricon	0	0		0	0	
streptomycin	0	1		1		21
achromycin	1	2		1		0
diphtheria toxoid	0		2	1	0	
diphtheria antitoxin	0		0	2	6	
carzinophilin	0.4	1	1.33	0.25		
zarkomycin	1.8	2.2	5	0.8		
sodium sulfide	5.2	8	1.2	0.2		
sodium salicylate	1.3	2.4	4.3	0.3		
salvarsan	0		1	0	0	
acidosis	4		5	2	0	
alkalosis	1		3	1	0	

(4) Lung, kidney, liver and heart

The eosinophil cells in the lung, kidney, liver and heart hardly showed any reactions. In the diptheria antitoxin administered mouse, however, they did show some

reactions somewhat even after 7 days.

CONCLUSION

We administered the mice using penicillin, ferric glucuronate, streptomycin, achromycin, acetylcholine (obisot), diphtheria toxoid, diphtheria antitoxin, carzinophilin, zarkomycin, sodium sulfide, sodium salicylate and salvarsan. Besides, letting the mice fall in acidosis or alkalosis, applying ultrasonic waves on them and soaking them in Yuda hot-spring, we examined the eosinophil cells in the cardia and pylorus, small intestine, skin, artery wall, vein wall, lung, kidney, heart and spleen.

(1) The reaction of eosinophil cells appeared most strongly upon the cardia and pylorus and had intermediately effects upon the skin, small intestine, vein wall, artery wall, and spleen and little effects upon the lung, kidney, liver and heart.

(2) The eosinophil cells in the lamina propria mucosae tended to increase day by day, attaining the maximum on the 3rd day. Then they began to decrease by degrees, nearly recovering the normal level on the 7th day. In the mouse administered with penicillin, streptomycin, achromycin, or ferric glucuronate (gluferricon) there appeared their effects upon the eosinophil cells. Especially in the diphtheria antitoxin administered mouse, their increasing tendency was still observed even after 7 days.

(3) The reaction upon the eosinophil cells in the organs of the diphtheria antitoxin administered mouse persisted even after 7 days.

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