PCBs IN ABDOMINAL ADIPOSE TISSUE OF A CANINE

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Introduction

We assumption that the measurement of PCBs for companion animal is designed as one of method to evaluate pollution of a human.

It is fact that a kind of food is different, and of 90% of human body pollution depend on food origin, but a common environmental factor such as air, water, soil, will be affect to PCBs pollution to both. For a fat solubility of PCBs is large, when it taken into the animal body, its shift to fat abundant organs and accumulate there.

There are many reports on about PCBs storage in ocean creature traditionally, but there are a few reports about a canine [1,2] as a companion animal.

This report measured the gross weight of Co-PCBs of an abdominal adipose tissue of a canine and isomer configuration and made a level of a canine abdominal adipose tissue clear and did measurement to be similar about marketed canine food.

Method

The abdominal adipose tissue of canine were sampling from 13 canines, which died at our animal hospital. It was checked age of canine, the body weight, male and female, the cause of death with range to understand.

The canine food measured 17 kinds of things, which appeared in a market in Japan.

The analytical procedure of PCBs [3] is as follows: The samples (4g) were homogenized with 100g of sodium sulfate, and Soxhlet-extracted for 7 hr with mixture of diethylether and hexane (3:1, 200ml). One-half of the extracted solvents were added 6ng of internal standard. The fat was removed by saponification and sulfuric acid treatment and silica gel column chromatography.

The quantification of PCBs were made on JMS700 (JEOL Co. Tokyo, Japan) with selected ion monitoring under the following conditions: electron impact ionization (EI) mode at 60 eV: ion source temperature 280°C: HRMS (R=10000). The GC capillary column was SPB-Octyle (Supelco Co., 50m 0.25mm i.d. 0.25um film). The column temperature was programmed from 100 to 260°C at a rate of 30°C/min.

Result

An intending canine was 4 male, 8 female, 1 unknown by 13 canine, the age was 0.33-16 years old (an average of 5.02 years old, indistinct 1).

Ether of PCB189 or PCB 118 was detected among PCB isomers most highly in an adipose tissue. The ratio that both isomers held in the whole was equal to or more than 30%, and ten of them were equal to or more than 50% between them. The total value of 12 kinds of PCB

concentration was the smallest 309.1 pg/g maximum 4955 pg/g.

The results showed in Table 1. The PCB concentration according to isomer in canine food showed Table 2. A concentration of PCB118 in adipose tissue was characterized and the other isomers were the low level or non-detection generally, on the other hand, PCB77 in a part of canine food was measured in a high level.

Table. 1 PCB concentration in abdominal adipose tissue of canine (pg/g fat).

	#77	#81	#105	#114	#118	#123	#126	#156+ #157	#167	#169	#189
C1	366.8	158.1	78.2	24.9	411.6	37.5	40.7	341	200.4	234.7	1399
C2	153.2	157.8	401.9	62.5	904.8	73.3	N.D.	440.6	319.1	237.7	1184
C3	54.5	18	65.7	10.7	99.7	16.6	18.4	65.9	61.1	72.8	510.7
C4	119	49.9	206.3	62.1	312.4	32.1	68.5	307	189	298.5	687.1
C5	23.2	26.9	39.5	16.5	87.1	16.3	18	86.4	82.2	43.7	314.1
C6	54.7	74.8	145.1	23.2	350.9	38.8	22.4	144.7	59.8	44.5	328.8
C7	13.7	28.2	43.8	11.7	215.6	22	33.9	89.4	28.2	100.8	145
C8	26.5	12.3	35.7	14.4	32.5	29.7	12.2	48.5	19.7	18.2	59.4
C9	10.5	20.7	67.9	23.5	247.3	69.5	39.8	84.6	113.6	56.8	256.9
C10	248.9	74.9	66.1	136.9	457.3	4.3	151.9	419.4	127.7	175.6	294.5
C11	81.8	59.4	188.9	206.2	1200	162.8	73.2	1556	166.1	60.6	1200
C12	101.8	10.7	21.1	82.8	647.5	29	33.2	247.5	18.3	13.7	249
C13	251.2	3.3	22	79.6	497.7	30.5	40	356.4	29.1	3.4	394.7

Table. 2 PCB concentration in canine food (pg/g fat).

	#77	#81	#105	#114	#118	#123	#126	#156+ #157	#167	#169	#189
f1	N.D.	N.D.	N.D.	5.93	17.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f2	N.D.	N.D.	N.D.	7.89	29.45	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f3	N.D.	N.D.	N.D.	N.D.	16.12	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f4	N.D.	N.D.	N.D.	N.D.	23.23	N.D.	N.D.	8.66	N.D.	N.D.	N.D.
f5	N.D.	N.D.	N.D.	6.35	24.38	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f6	5.00	N.D.	N.D.	10.65	49.15	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f7	5.36	N.D.	N.D.	N.D.	14.26	N.D.	5.00	N.D.	N.D.	N.D.	N.D.
f8	5.47	N.D.	N.D.	5.70	19.69	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f9	7.80	N.D.	N.D.	8.77	26.58	N.D.	N.D.	N.D.	9.18	N.D.	N.D.
f10	11.37	N.D.	N.D.	10.96	38.82	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f11	11.6	N.D.	N.D.	5.72	17.54	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f12	11.64	N.D.	N.D.	7.64	32.97	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
f13	72.47	7.36	N.D.	13.79	44.69	N.D.	N.D.	5.90	N.D.	N.D.	N.D.
f14	88.09	N.D.	N.D.	11.82	32.35	5.36	N.D.	19.56	N.D.	N.D.	N.D.
f15	147.5	36.98	3.70	27.86	82.5	N.D.	N.D.	10.59	7.86	N.D.	5.63
f16	158.9	62.2	11.73	70.85	348.4	8.43	33.1	40.8	20.94	5.09	N.D.
f17	391.3	48.41	N.D.	6.91	18.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Discussions and Conclusions

As for accumulation of PCBs in a body of canine by eat a canine food PCB118 was dominated. There can almost neglect the other isomer because the level of each isomer is so low. Although a canine had the possibility that PCB118 was accumulated by food and, actually, PCB118 in a canine adipose tissue was high concentration with PCB189. This is not only regard as influence by food origin, but also foodstuffs of a human will be influence for accumulation of PCBs adipose tissue of canine. In addition, if the accumulation caused by canine food, the concentration of PCBs in adipose tissue become high, but, actually, the equilateral correlation was not found between age and the PCB118 (Fig. 1A). It is thought to the differences of PCB conversion from a parent canine in juvenile day, and difference of quantity and quality of food take into account for the difference. The concentration of PCB105, PCB189 increases with age dependent (Fig.1B, 1C).

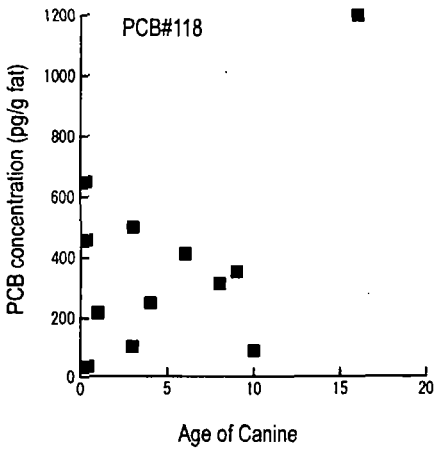

Fig.1 A

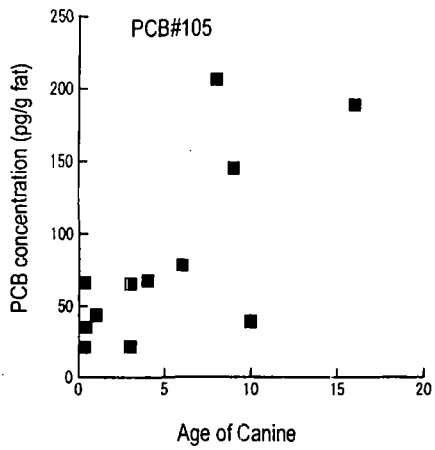

Fig. 1B

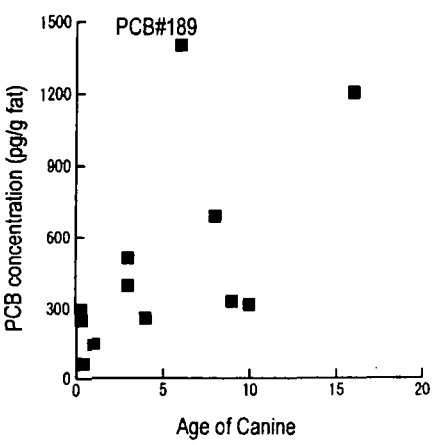

Fig. 1C

Fig. 1 Scatter plot of PCBs Concentration vs Age of Canine.

These results indicate to PCB105 may become index of age progress when we think about PCBs

pollution. On the other hand PCB189 is inferior to PCB105 as index nature of age progress, but the concentration in a canine adipose tissue may reflect to an environmental conditions especially PCBs pollution of soil and air highly.

Our study, a lack of data of this time about PCBs pollution of place of residence area of a canine, but we believe PCB189 was becoming to the index for PCBs pollution of human being and significant to do are large.

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