

ARGYROPHIL CELLS IN ADENOMAS OF FAMILIAL POLYPOSIS COLI

BY

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ABSTRACT

The presence of argyrophil cell was demonstrated in the adenomas of familial polyposis coli (FPC) with the Sevier-Munger method. Usually, argyrophil cells were distributed sparsely near the base of the crypts, rather close to the normal mucosa. But, adenomas with severe or moderate dysplasia did not contain argyrophil cells. The frequency of argyrophil cells in the adenoma was remarkably higher in the sigmoid than in the ascending colon. Because this phenomenon was found both in the non-adenomatous mucosal crypts of FPC and of normal control cases, it is conceivable that the appearance of the argyrophil cells in the adenomas of FPC is affected by the structural arrangement of the original non-tumorous mucosa, as a background. Furthermore, a tendency, that many argyrophil cells were located within the adenomas, was observed in one of the seven families examined. It showed that the argyrophil cell which is thought to be one of the elements constituting the adenoma might actively participate in the growth of the adenoma.

INTRODUCTION

Colonic mucosa consists of three types of epithelial cells: absorptive epithelial cells, goblet cells and the so-called APUD cells¹. Although histological and histochemical studies have already been done concerning the APUD cells [1-6], it has still not been clarified that these APUD cells have any relationship with the tumor development and its differentiation.

In this report, the presence and distribution of the argyrophil cells in the adenomas of familial polyposis coli (FPC) were shown histologically by using the Sevier-Munger method [7]. The difference between the frequency of the argyrophil cells of the non-adenomatous colonic mucosa and of that of the adeno-

mas of FPC was also discussed.

MATERIALS AND METHODS

The colons removed by total colectomy from 14 Japanese patients, who had been diagnosed as FPC and colon obtained from an autopsy case, were examined. Non-tumorous colons of five patients with colon cancer (non-familial, adenocarcinoma) were also studied as control.

All materials were fixed in 10% formalin. After fixation, one tissue block of 2.5 cm in length was taken at random from the ascending and sigmoid colons and dehydrated with graded ethanol and embedded in paraffin. The thin sections of 4 μ m in thickness were stained with routine hematoxylin-eosin and by the Sevier-Munger method of argyrophil re-

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action [7] and examined histologically.

The statistical significance was evaluated with Student's t-test.

RESULTS

1. Adenomas of FPC

Clinical information on age, sex and family, and histological findings were summarized in Table 1. The number of adenomatous foci observed in a tissue section regardless of its size was enumerated. The total number of adenoma foci in a tissue section, the frequency of adenoma bearing argyrophil cells per total adenomas within one tissue section and the frequency of argyrophil cells in one adenoma in the ascending and sigmoid colons of the respective cases were shown

in Table 1.

Argyrophil cells were more often present in the adenomas with less dysplasia and were located at the marginal area of the adenoma foci close to the non-tumorous mucosa (Fig. 1), although its frequency was much lower in the adenoma than in the normal mucosa of the colon. The frequency of argyrophil cells was apparently different between the adenomas of the ascending and sigmoid colons. However, a significant difference in the frequency of adenomas per one tissue section was not seen between both sites. Argyrophil cells were found more in the sigmoid than in the ascending colon, both in regard to the frequency of adenoma bearing argyrophil cells per total adenomas in the tissue section

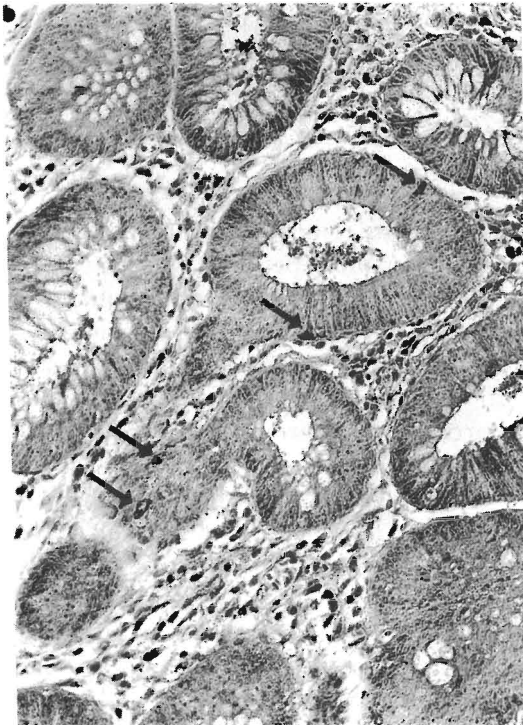


Fig. 1. Argyrophil cells in adenomas of familial polyposis coli (FPC) (Case 6, sigmoid colon). Argyrophil reaction-positive cells with dark granules are seen scattered in the adenoma (arrows). This adenomatous region is close to the normal mucosa of colon. Sevier-Munger method of argyrophil reaction, $\times 300$.

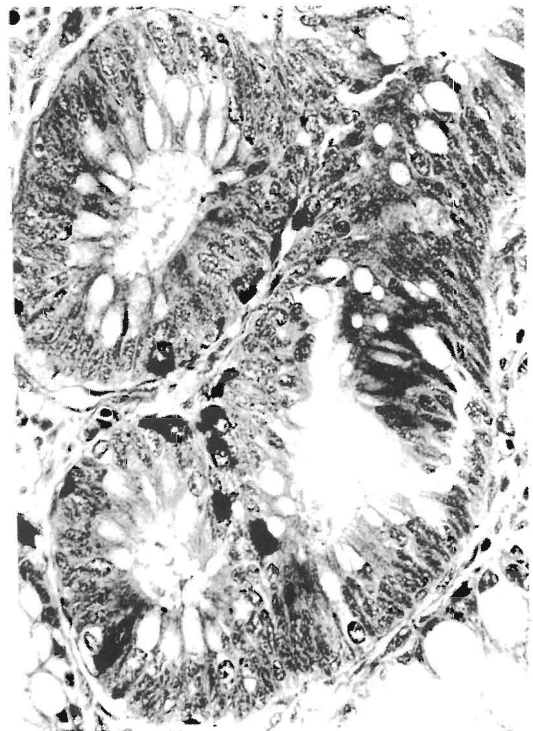


Fig. 2. Argyrophil cells in adenomas of FPC (Case 1, sigmoid colon). Argyrophil cells are collected or accumulated in one portion of the adenoma. Sevier-Munger method of argyrophil reaction, $\times 500$.

Table 1. Appearance of Argyrophil Cells in Adenomas of Familial Polyposis coli

Case	Sex	Age	Material	Family	Ascending colon					Sigmoid colon				
					Number of adenomas bearing argyrophil cells per one adenoma	Number of adenomas bearing 10 or more argyrophil cells in one section (2.5 cm in length)	Number of adenomas bearing argyrophil cell/total adenomas	Number of adenomas bearing 10 or more argyrophil cells in one section (2.5 cm in length)	Number of adenomas bearing argyrophil cell/total adenomas	Number of adenomas bearing 10 or more argyrophil cells in one section	Number of adenomas bearing 10 or more argyrophil cells in one section (2.5 cm in length)			
1	S.K.	M	53	Op	T-78	0.23	0.36	0	39	0.93	9.30	8	27	
2	S.N.	F	27	Op	T-78	0.56	1.00	0	9	0.63	3.15	3	27	
3	N.T.	F	46	Op	T-74	0.11	0.11	0	35	0.25	0.53	0	32	
4	S.T.	M	53	Op	T-78	0.32	0.44	0	25	N.E.				
5	K.S.	F	24	Op	T-77	0.00	0.00	0	1	0.80	3.00	0	5	
6	S.Y.	F	20	Op	T-78	0.00	0.00	0	12	0.74	6.70	6	23	
7	K.N.	M	27	Op	T-80	0.00	0.00	0	1	1.00	5.00	0	1	
8	K.S.	M	20	Op	T-80	0.00	0.00	0	6	0.83	6.50	1	6	
9	W.M.	F	20	Op	T-70	0.25	1.25	0	4	0.20	2.40	1	5	
10	K.K.	M	38	Op	T-70	0.50	0.50	0	2	0.33	0.33	0	6	
11	M.M.	F	44	Op	T-63	0.14	0.14	0	7	0.43	4.43	1	7	
12	M.T.	M	30	Op	T-87	0.33	0.33	0	3	1.00	3.00	0	2	
13	M.T.	M	26	Op	T-87	0.50	1.50	0	2	0.00	0.00	0	1	
14	S.S.	M	41	Au	T-78	0.30	0.40	0	10	0.46	0.77	0	13	
15	T.M.	F	30	Op	T-90	0.50	0.50	0	2	0.66	1.67	0	3	
Mean±S.E.						0.25*±0.05	0.44*±0.12		10.5**±3.1	0.59*±0.08	3.34*±0.71		11.3**±2.8	

* Significant between two sites (p<0.01)

** Not significant Op: Operation Au: Autopsy N.E.: Not examined S.E.: One standard error

and the argyrophil cells per one adenoma. Furthermore, the adenoma bearing ten or more argyrophil cells was seen only in the sigmoid colon (Fig. 2). These adenomas bearing many argyrophil cells were found relative-frequently in one particular family, T-78.

2. *Non-adenomatous colonic mucosa of FPC*

The frequency of argyrophil cells per one crypt, which was adjacent to the muscularis mucosa, was calculated in the non-adenomatous, non-tumorous mucosa of FPC. As shown in Table 2, it was much higher in the sigmoid than in the ascending colon.

3. *Non-neoplastic colonic mucosa of control cases with colon cancer (non-familial, adenocarcinoma)*

As control cases, the non-tumorous mucosae of the ascending and sigmoid colons were observed in five cases with colon cancer by the same method as that of FPC. As shown in Table 3, it was revealed that the frequency of argyrophil cells per one crypt was higher in the sigmoid than in the ascending colon. Accordingly, this result demonstrated the same tendency as that of the non-adenomatous mucosa of FPC.

DISCUSSION

The present results confirmed that the argyrophil cells were found scatteringly

in the adenomas of FPC, although their frequency was much lower than that of the non-tumorous mucosa of the colon. On the other hand, adenomas with severe or moderate dysplasia contained no argyrophil cells. This fact suggested that with reference to tissue differentiation the argyrophil cells appeared in the adenomas with slight dysplasia.

Table 2. Appearance of Argyrophil Cells in Non-adenomatous Colonic Mucosa of Familial Polyposis coli

Case	Frequency of argyrophil cells per* one crypt adjacent to muscularis mucosa	
	Ascending colon	Sigmoid colon
1	0.38	2.43
2	0.27	0.81
3	0.28	0.84
4	N.E.	N.E.
5	0.49	1.39
6	0.32	1.18
7	0.50	1.36
8	0.77	1.44
9	0.61	1.14
10	0.33	1.31
11	0.25	1.15
12	0.48	2.09
13	0.40	1.28
14	0.17	0.57
15	0.56	1.30
Mean±S.E.	0.42±0.04**	1.31±0.12**

* Number of crypts examined in each colon: 64-152

**Significant between two sites ($p<0.001$)

Table 3. Appearance of Argyrophil Cells in Non-tumorous Colonic Mucosa of Control Cases with Colon Cancer (Non-familial)

Control Case No.	Age	Sex	Site of mucosa examined	Frquency* of argyrophil cells per one crypt adjacent to the muscularis mucosa	Mean±S.E.
1	58	F	Ascending colon	0.67	0.48±0.18**
2	28	M		0.30	
3	70	F	Sigmoid colon	1.15	1.24±0.04**
4	65	M		1.25	
5	41	M		1.32	

* Number of crypts examined in each case: 137-282

** Significant between two sites ($p<0.02$)

Although most of the argyrophil cells were found scatteringly in the adenomas of FPC, adenomas bearing 10 or more argyrophil cells were occasionally found in the sigmoid colons in a few cases. Furthermore, collective localization of these cells was also found. These findings raised the possibility that the argyrophil cells participated actively in the growth of the adenoma as one of the elements constituting adenoma. The appearance of adenoma bearing many argyrophil cells was relatively concentrated in the family, T-78. Accordingly, there is a possibility that a special gene related to the appearance of many argyrophil cells in the adenomas was inherited in this family.

As shown in Table 1, the frequency of the adenomas with argyrophil cells in the total adenomas as well as the argyrophil cells per one adenoma in a tissue section of the same size was significantly higher in the sigmoid than in the ascending colon. It was revealed that this tendency of the difference between the two sites was quite similar to those on the frequency of the argyrophil cells in the crypts of the non-adenomatous colonic mucosae of the same patients with FPC and of the non-neoplastic colonic mucosae of the patients without FPC, as shown in Tables 2 and 3. It was very interesting from the viewpoint of adenoma development⁸ that the frequency of the argyrophil cells in the adenomas was quite correlative to that of the normal mucosa of the colon. Namely, it was suggested that the cell differentiation of adenoma was also strongly influenced in

relation to the situation of the essential factors of the original, normal mucosa of the host.

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