

to notice the sphincter portion of the ovijector. The caudal papillæ in *S. minetti*, according to Deo, were in 10 pairs. A total of 11 pairs was observed in the present material. In *S. brumpti* there were 5 pairs of preanals and 5 pairs of postanals. 6 pairs of preanals, as stated by Deo (1964), have been reported by Gendre (1909) and Gedoelst (1916). Evidently, the number varies from 10 to 11. No differential characters can thus be found between these two species. *S. minetti* is, therefore, suppressed as a synonym of *S. brumpti* which, in Indian region, has its intermediate host in *G. depressum* F. known from other countries as well (Soulsby, 1965). Its prepatent period, under our conditions, is 60 to 66 days.

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MORPHOLOGICAL CLASSIFICATION OF THE DENDRITIC CELLS OF THE EPIDERMIS OF THE BLACK GUINEA-PIG

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SHUKLA,^{1,2} on the basis of biometric and morphologic analysis, classified the DOPA negative dendritic cells of the epidermis of the black guinea-pig, having 5, 4, 3 and 2 dendritic processes, as Type I, II, III and IV Langerhans' cells, respectively. In the present communica-

Shukla, Karkun and Mukerji.⁴ The digest is mounted on albuminised slides and examined under the microscope. On the basis of the strength of DOPA response and the number of the dendritic processes, the following types of cells are recognised in the mount:

Type 1.	DOPA (+) cell having 8 dendritic processes	} Melanocytes (Group A)
Type 2.	DOPA (+) cell having 7 dendritic processes	
Type 3.	DOPA (+) cell having 6 dendritic processes	
Type 4.	DOPA (+) cell having 5 dendritic processes	
Type 0'	DOPA (±) cell having 6 dendritic processes	} Intermediate cells of Billingham and Medawar (Group B)
Type 0''	DOPA (±) cell having 5 dendritic processes	
Type I	DOPA (—) cell having 5 dendritic processes	} * Langerhans' cell (Group C)
Type II	DOPA (—) cell having 4 dendritic processes	
Type III	DOPA (—) cell having 3 dendritic processes	
Type IV	DOPA (—) cell having 2 dendritic processes	

* The DOPA negative cells of group C bearing 5, 4, 3 and 2 dendritic processes respectively identified as Type I, II, III and IV Langerhans' cells, have already been examined by Shukla.^{1,2} The characteristic features of this group is presented in Table II to demonstrate the intermediate nature of the Intermediate cells.

tion, a biometric and morphological classification of the DOPA positive dendritic cells of the epidermis of the black guinea-pig, having 5 to 8 dendritic processes,³ is made to review the classification of the entire group of dendritic cells.

The pure epidermis preparation, obtained from the dorsal surface of the black ear of the black and white guinea-pig, is digested in a solution of 3,4-dihydroxyphenylalanine in normal saline according to the technique of

These cells, identified as above, are marked and then measured under the light microscope. Later, these slides are either partially demelanised in 10% H₂O₂ for 4 hours or fully demelanised for 8 hours and washed in running water for 15 minutes. Both are stained with hæmatoxylin and eosin, Masson-Fontana stain for melanin⁴ and mounted in balsam after the usual process of dehydration and clearing. The result of the examination of these slides is presented in Table I.

TABLE I
The characteristic features of the ten types of the epidermal dendritic cells of the black guinea-pig

Group of dendritic cell		A (Melanocyte)			B (Intermediate cells)		
Type of dendritic cell	..	1	2	3	4	0'	0''
Number of dendritic processes	..	8	7	6	5	6	5
Response to DOPA	..	+	+	+	+	±	±
Cell characters :							
Shape	..	py	py	py	pe	he	pe
Total length (in μ)	..	65	65	60	55	50	50
Length of body (in μ)	..	15	15	12	10	10	10
Breadth of body (in μ)	..	10	10	10	10	10	10
Dendritic process characters:							
Breadth at root (in μ)	..	3	3	2	2	2	2
Breadth at tip (in μ)	..	3	3	3	3	2	2
Mode of branching	..	di	di	di	di	less di	less di
Nuclear characters :							
Shape	..	notched egg	notched egg	notched egg	notched egg	notched egg (irregularly)	oval
Size (length \times breadth in μ)	..	12 \times 6	12 \times 6	11 \times 6	11 \times 5	10 \times 5	10 \times 5
Stainability with hæmatoxylin	..	+	+	+	+	+	+
Cytoplasm :							
Stainability with eosin	..	±	±	±	±	±	±

Py, pe, he, re, tr, fu and di indicate polygonal, pentagonal, hexagonal rectangular, triangular, fusiform and dichotomous respectively.

TABLE II
Characters of the melanocyte, intermediate cell and Langerhans group of dendritic cell of the epidermis of the black guinea-pig

		Melanocyte group	Intermediate cell group	Langerhans' cell group
1. DOPA response	..	+	±	—
2. Shape	..	polygonal to pentagonal	pentagonal and hexagonal	pentagonal to fusiform
3. Size	..	65-55	50	46-35
4. Dendritic process number	..	8-5	5-6	5-2
Dichotomy	..	+	±	—
Breadth at tip	..	2	1	fine
5. Nucleus:				
Shape	..	notched egg	oval	shape of the body of cell
Size	..	12 \times 6 to 11 \times 5	10 \times 5	10 \times 5 to 9 \times 4
Stainability with hæmatoxylin	..	+	+	++
6. Cytoplasm:				
Stainability with eosin	..	±	±	+
Nucleus/cytoplasm ratio	..	2/3	2/3	4/5

The group characters of the melanocyte, Intermediate cell and the Langerhans' cell are presented in Table II.

The study of Table II shows that the cells of the Intermediate group have characters which are intermediate between those of the melanocytes and the Langerhans' group of cells.

As the melanocytes examined here, as well as the group of Langerhans' cell possess dendritic processes, star-shaped bodies and a large single nucleus in the centre of each cell, they probably form one class of cells. The class, on biometric analysis, is shown to be divided into Type 1 to 4 melanocyte, Type 0' and 0'' Intermediate cell and Type I to IV Langerhans'

cell, each having a constant size. The constancy of the cell size of each group, following the Dreichets' Law of Constant Volume of cells,⁷ supports their classification into the above-mentioned types.

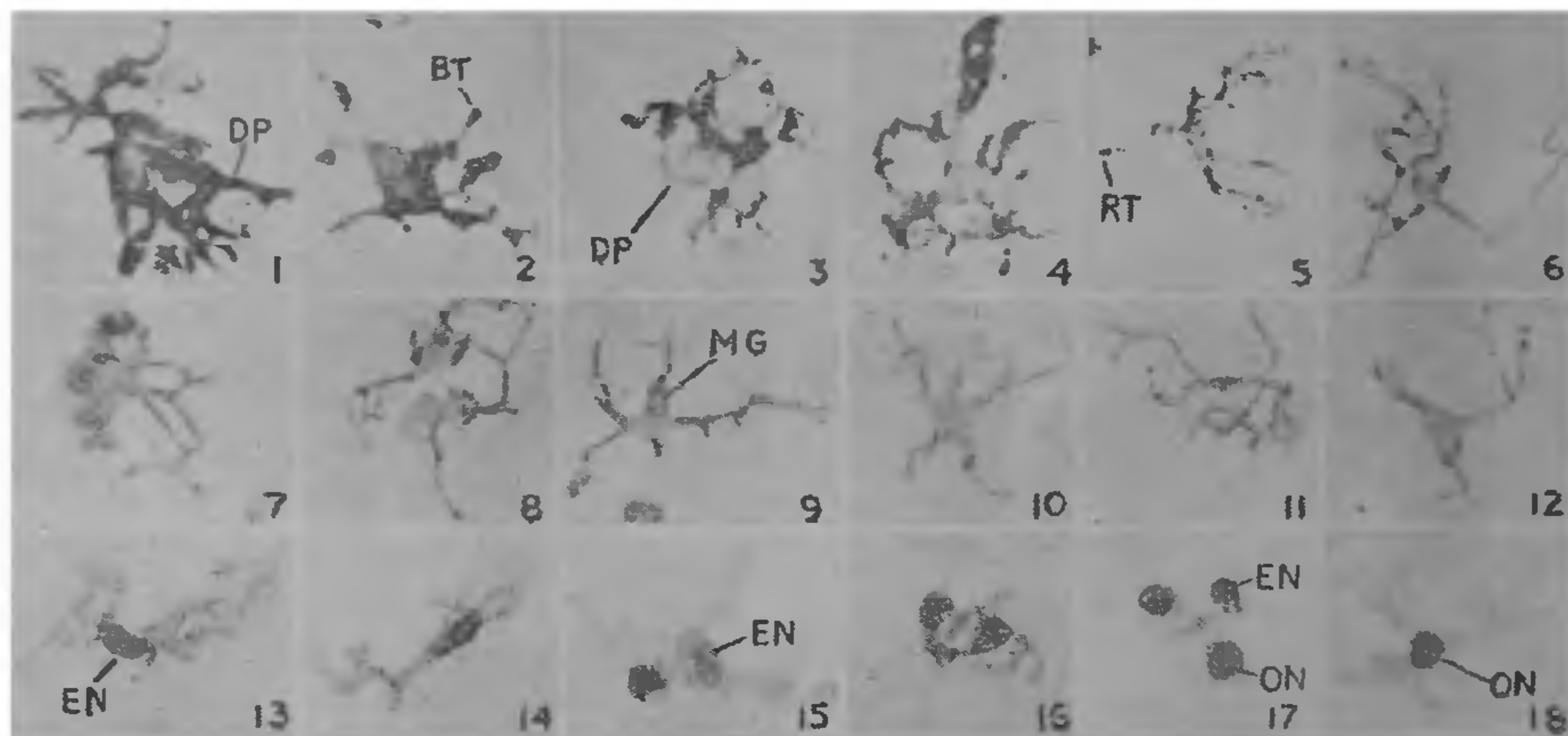
The study of Table I shows that this dendritic class of cells is headed by the melanocyte group, where the Type 1 melanocyte, being the largest cell with 8 dichotomously branched, blunt-tipped (Fig. 2, BT) dendritic processes (Fig. 1, DP) and a single, characteristically double-notched,⁸ egg-shaped, basophilic nucleus (Fig. 13, EN) forms the first of the series and also the first of the melanocyte group. The Type IV Langerhans' cell (loc. cit.), being the smallest cell of

the dendritic series with two unbranched dendritic processes and a degenerating fusiform, deeply basophilic nucleus forms the last cell of the series. The dendritic processes of Type 2, 3 and 4 melanocyte, Type 0' and 0'' Intermediate cell and Type I, II and III Langerhans' cell in order seem to undergo a gradual reduction in size⁹ and number. It indicates that the cells bearing these processes in the order mentioned above form the intervening stages of senescence between Type 1

The melanin granules, which are exuberant in the melanocytes (Fig. 9, MG) are reduced in quantity in the Intermediate cell (Figs. 11 and 12) and became extinct in the Langerhans' cells.

The observations made here substantiate the hypothesis of Billingham and Medawar¹² that the melanocytes, after they had discharged their pigment, transform into Langerhans' cell through Intermediate cells.

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FIGS. 1-18. Figs. 1-6 show some of the dendritic cells of the epidermis of the ear of the black guinea-pig after treatment with DOPA. Figs. 1-4 respectively show frankly DOPA positive, Types 1, 2, 3 and 4 melanocytes bearing 8, 7, 6 and 5 dichotomously branched (DP) and bulb-tipped (BT) dendritic processes. Figures 5 and 6 respectively show Type 0' and 0'' Intermediate cells of Billingham and Medawar bearing 6 and 5, less dichotomously branched and bulb-tipped (BT) dendritic processes. Figures 7 to 12 respectively show Types 1, 2, 3 and 4 melanocytes and Type 0' and 0'' Intermediate cells of Billingham and Medawar after treatment with Masson Fontana stain. The dendritic processes and the bodies of the melanocytes are packed with melanin (MG). The Intermediate cells show lesser amount of melanin in the body of the cells. Figures 13-18 show Types 1, 2, 3 and 4 melanocytes and Type 0' and 0'' Intermediate cells of Billingham and Medawar after treatment with Mayers' haemalum. Each of the melanocyte shows a vesicular, egg-shaped (EN), basophilic and double-notched nucleus in the centre of the body of the cell, occupying 2/3 of the cytoplasm. The Intermediate cells of Billingham and Medawar show rounded or oval, basophilic nucleus filling nearly 4/5 of the body of the cell.

melanocyte and Type IV Langerhans' cell. This is further shown by the moderately basophilic, double-notched and egg-shaped nucleus of the melanocyte changing to the notch-less and oval form (Figs. 17, 18, ON) in the Intermediate cell, which gradually becomes more basophilic, shrunken and crenated¹⁰ as it consecutively assumes pentangular, rectangular, triangular and fusiform shape, corresponding to the shape of their body in Type I to IV Langerhans' cell. The cytoplasm in the melanocyte, which is neutral in character and occupies nearly 1/3 of the space round the nucleus, as it is gradually reduced in quantity and changed to acidophilic¹¹ nature through the above-mentioned series of cells, shows the same phenomenon.

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