

REGIONAL DIFFERENCES IN THE NUMERICAL PARTICLE DISTRIBUTION  
IN THE PLASMA MEMBRANE OF A MOLLUSCAN EGG

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Using freeze-fracture electron microscopy, regional differences between four areas on both P- and E-face of the plasma membrane of fertilized uncleaved eggs of *Nassarius reticulatus* were analyzed. The four investigated areas, which can be distinguished by specific patterns of microvilli, are: 1) the animal hemisphere, with a random distribution of microvilli, 2) the upper part of the vegetal hemisphere, with a more regular pattern of microvilli, 3) a more vegetal area in which the microvilli are aligned in rows, and 4) the so-called vegetal pole patch which is characterized by the presence of less numerous but very long microvilli (see Fig. 1).

Comparing the patterns of intramembranous particle (IMP) density and IMP-size of these four areas the following differences were observed. The mean IMP-diameter on both E- and P-face is highest in the animal hemisphere and decreases towards the area adjacent to the vegetal pole patch. The pole patch itself is comparable with the animal plasma membrane in this respect (see Table 1). The total IMP-density on both E- and P-face is lowest in the animal hemisphere and increases towards the vegetal pole patch (see Table 2).

These results demonstrate the presence of an animal/vegetal polarity in the plasma membrane of the egg of *Nassarius reticulatus*. These regional differences in the properties of the plasma membrane could play an important role in cell diversification during early development.

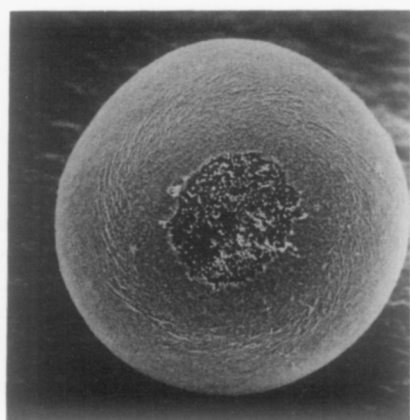


Fig. 1. SEM-micrograph of a *Nassarius* egg showing the vegetal pole patch characterized by a specific type of microvilli ( $\times 400$ ).

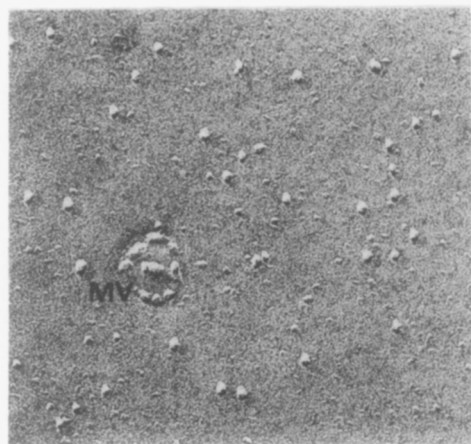


Fig. 2. E-face of the plasma membrane of the animal hemisphere; MV = microvilli ( $\times 100,000$ ).

Area	E-face	P-face
1	10.04 $\pm$ 0.02	8.60 $\pm$ 0.02
2	9.62 $\pm$ 0.02	8.35 $\pm$ 0.02
3	9.03 $\pm$ 0.02	8.16 $\pm$ 0.02
4	10.29 $\pm$ 0.02	8.51 $\pm$ 0.02
	$\bar{x}$ SEM	$\bar{x}$ SEM

Table 1. Mean IMP-diameter (nm) in the *Nassarius* egg plasma membrane; total number of particles measured is 111,497 and total area is 585.5  $\mu^2$ . IMP-analysis was carried out on electron micrographs with a final magnification of 250,000 $\times$  using a minicomputer equipped with a digitizer table.

Area	E-face	P-face
1	121.1 $\pm$ 4.7 (5)	238.1 $\pm$ 11.4 (2)
2	150.2 $\pm$ 7.4 (4)	170.1 $\pm$ 12.4 (3)
3	164.8 $\pm$ 20.3 (3)	302.1 $\pm$ 51.3 (2)
4	219.6 $\pm$ 20.4 (3)	453.5 $\pm$ 146.0 (2)
	$\bar{x}$ SEM (n)	$\bar{x}$ SEM (n)

Table 2. IMP-density ( $/\mu^2$ ) in the plasma membrane of the *Nassarius* egg;  $\bar{x}$  = mean value, sem = standard error of the mean, (n) = number of eggs.

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