THE ASSESSMENT OF GRANULOCYTE CHEMOKINESIS IN DIFFERENT MEDIA

ANDRZEJ GODLEWSKI and PIOTR M. BRZEZIŃSKI
Department of Histology and Embryology, Medical University in Łódź, Poland

Chemokinesis is classified as a form of random cell movement. The roles of environmental conditions on cell motility were established. In experimental conditions, measurements of cell motility are based on distance estimation between the starting line and the position of the cells after a given time. The assessment of PMN chemokinesis in vitro in media with BSA, gelatin and gelatin with fMLP, being the ratio of the distance between the start and end of cell walk (line between two points) to full distance of cell travel.

PMNs from the peritoneal exudate of guinea pigs were suspended in media with 1% gelatin [G], 1% BSA and 1% gelatin with fMPL (10^{-8} M) [GF] and studied in Zigmond chambers (37°C, 95% CO_{2}) under a phase contrast microscope (75x). Cell movement was registered by camera over a 30 second period (frame collection every 62.5 msec). In a digital image analysis system, every frame was analyzed, and the cells’ gravity centers [GC] were established. For all the studied cells, we estimated GC:displacement (full way) [D], distance between the start and end points of the walk [R], rest time [TR], time for cells to return to their start point [TRS], and time of cell rest at the start point after return [TS]. The statistical analysis of the results included: distribution of data and their correlation.

In all the studied groups, the majority of the studied cells had periods of walk punctuated by periods of rest. A negative or reciprocal and statistically significant correlation was found between cell displacement distance and TR, while a positive correlation between TRS and TS was noted. Significant correlation was observed between cell square displacements: in the medium with BSA, they took the form of square root equations, but between G and GF was, there was a linear relationship (r=0.975, p=0.000). Correlation between the R-values was linear, and similarly, most pronounced between G and GF. The results of the estimation of correlation between R and TRS indicate a relatively weak relationship between the above values (0.25<r<0.5). No relationship was noted between D and R.

The chemokinesis of PMNs have features of random walk but, contrary to Brownian movement, the cells rest, sometimes at the start point. The place memory of cells during chemokinesis may be suggested. A strong relationship between rest time and displacement explains the variability in cell velocities described in the literature.

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