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1986 APS FALL MEETING

OCTOBER 5-9
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STOCHASTIC ASPECTS OF LEUKOCYTE TRANSIT IN ARTERIOLES.

Robert Mayrovitz*, Ran Rubin* and Harvey N. Mayrovitz
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Circulating leukocytes that become entrapped within the microvasculature affect the outcome of several pathological states including myocardial infarction. However, no quantitative data describing the stochastic features of leukocyte delivery to capillaries is available for any conditions. Thus we studied leukocyte transit through arterioles (diameter<20μm) in the hamster cheek pouch by rendering cells fluorescent via a constant infusion of acridine orange. Electronic signals generated as cells passed a fixed observation site were obtained and analyzed as a stochastic point process. The stochastic features of cell transit were then evaluated in terms of the time between adjacent cells (TC) and number of cells per unit time (leukocyte flux). Data reported is based on sequential observation times of 600 s in each of five animals. No less than 400 leukocytes were observed in any experiment. Comparison of the observed frequencies of TC against expected values for Poisson, Gaussian and uniform distributions was done with chi-square & Kolmogorov-Smirnov tests for goodness of fit. Results of all experiments show that at a statistically significant level ($p>.05$), the distribution of TC can be characterized as Poisson. Results also indicate that under the same statistical guidelines, the leukocyte flux fits a Gaussian distribution.

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