

## CHAPTER 2: PROBLEM

The absolute leukocyte differential count is used by clinicians as an indicator of their patient's disease status and response to therapy. From the literature it is clear that a 100 leukocyte manual differential count is not a very accurate way to establish the true distribution of leukocytes in blood.

Manual leukocyte counting is also a very slow and labour-intensive method. A laboratory technologist can only do a limited number of manual differential counts per day. With an ever increasing demand on laboratories to do more work more efficiently, automation has become an essential development in the clinical pathology laboratory in all possible areas.

The movement towards automation has led to the development of several methods for automated leukocyte differential counting. These methods are developed primarily for use in the field of human haematology. Some methods had been less successful and had fallen into disuse. Other methods, such as flow cytochemistry<sup>7</sup> and laser light scatter separation<sup>12, 26, 31, 36</sup> have been found to be very useful in human haematology.

Electronic impedance counting and sizing only reports a three-part differential leukocyte count, which has limitations due to the absence of reports on eosinophilias<sup>73</sup>. Quantitative buffy coat analysis does not give a five-part differential count, although it is reported to be an acceptable technique in veterinary haematology<sup>11, 46</sup>.

Canine leukocyte differential counts have been reported to be accurate on the Technicon H\*1<sup>22</sup>, a technique which makes use of flow cytochemistry. However, this instrument requires various reagents and the differential leukocyte count presents problems in most of the other domestic species<sup>72</sup>.

Differential leukocyte counting based on the method of multi-angle polarised scatter separation appears, on theoretical grounds, to be ideal for use in dogs. At the time that the investigator was approached, the Cell-Dyn 3500 had not been fully evaluated for this purpose. The manufacturer approached several veterinary schools all over the world to participate in the evaluation.

In order to evaluate the technology, the instrument incorporating the technology must also be evaluated in general, in order to determine if any discrepancies arising are due to the method employed or other technical problems inherent to the instrument rather than those due to working with non-human leukocytes.