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The evaluation of a new haematological cell counter, the CELL-DYN 3500, on canine leukocyte differential counts

by

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SAMEVATTING

Die evaluering van 'n nuwe hematologie selteller, die Cell-Dyn 3500, op differensiële witseltellings van honde

PRINSLOO, T. Universiteit van Pretoria, 2000

Hierdie studie is onderneem om die Cell-Dyn 3500 se vermoë om differensiële witseltellings op honde bloedmonsters te doen, te evalueer. Alhoewel differensiële seltellings as deel van die meeste roetiene hematologiese ondersoeke gedoen word, is dit 'n baie tydrowende proses. Dit is dikwels 'n beperkende faktor in die aantal monsters wat daagliks deur 'n laboratorium geprosesseer kan word. Verskeie pogings is in die verlede gemaak om hierdie proses te outomatiseer. Hematologie analiseerders word egter ontwerp vir gebruik in die mediese veld en is dus nie altyd akkuraat as dit in die veterinêre veld aangewend word nie.

Die Cell-Dyn 3500 maak gebruik van laserlig weerkaatsingstegnologie om die differensiële witseltelling te outomatiseer. Die tegnologie bied 'n unieke metode van sel identifikasie en hou daarom die belofte in dat dit 'n verskeie spesies aangewend kan word.

Bloedmonsters van normale en siek honde is in die studie geëvalueer. Die monsters is gekies om 'n wye versameling van patologiese monsters in te sluit. Die differensiële witseltellings van die Cell-Dyn 3500 is vergelyk met 'n handmetode soos deur die "National Committee for Clinical Laboratory Standards" voorgeskryf.

Gevolgtrekkings wat uit die studie gemaak kan word is as volg:

Die totale witseltellings van die Cell-Dyn 3500 en die Baker System 9000 vergelyk gunstig, met 'n korrelasie koëffisïent van 0.989.

Die neutrofiel tellings van die Cell-Dyn 3500 vergelyk gunstig met die neutrofiel tellings van die handmetode, met 'n korrelasie koëffisïent van 0.981.

Die limfosiet tellings van die Cell-Dyn 3500 het redelik, maar nie baie goed met die van die handmetode vergelyk nie (korrelasie koëffisiënt 0.782), alhoewel die resultate effens gunstiger is as waarop die vervaardigers aanspraak maak (korrelasie koëffisiënt >0.70).

Die monosiet telling van die Cell-Dyn 3500 het swak vergelyk met die monosiet tellings van die handmetode (korrelasie koëffisiënt 0.097), maar dit stem ooreen met die fiet dat die vervaardigers geen aanspraak maak op korrelasie nie.

Die eosinofiel tellings van die Cell-Dyn 3500 het baie swak vergelyk met die handmetode se tellings (korrelasie koëffisiënt 0.304), wat in teenstelling is met die aanspraak van die vervaardiger (korrelasie koëffisiënt >0.70).

Die basofieltelling van die Cell-Dyn 3500 het geen korrelasie met die van die handmetode getoon nie (korrelasie koëffisiënt 0.0000). Dit is in ooreenstemming met die vervaardiger se afwesigheid van 'n aanspraak op korrelasie.

Die waarskuwings gemaak deur die Cell-Dyn 3500 oor abnormale monsters het nie goed vergelyk met die opmerkings gemaak deur die ondersoekers nie, met die uitsondering van waarskuwings vir gekernde rooibloedselle, waar daar in 73.13% van gevalle ooreenstemming was. Die identifikasie van onvolwasse neutrofiele was ook redelik, met ooreenstemming in 57.44% van die gevalle.

Die Cell-Dyn 3500 het uitstekende liniariteit getoon vir die totale witseltelling, met 'n korrelasie koëffisiënt van 0.999.

Die Cell-Dyn 3500 het geen waarneembare oordrag tussen monsters getoon nie.

SUMMARY

The evaluation of a new haematological cell counter, the CELL-DYN 3500, on canine leukocyte differential counts

PRINSLOO, T. University of Pretoria, 2000

This study was undertaken to evaluate the Cell-Dyn 3500's ability to do differential white blood cell counts on canine blood samples. Although differential cell counts are done as part of most routine haematological evaluations, it is a very time consuming process, which is a limiting factor in the number of samples that a laboratory can process daily. Various attempts have been made in the past to automate this process. However, haematological analyzers are designed for use in the human medical field and are therefore not always accurate when applied in the veterinary field.

The Cell-Dyn 3500 makes use of laser light scatter technology to automate differential white cell counting. This technology provides a unique way of identifying cells and therefore has the promise that it can be applied to various species.

Blood samples from both normal and sick dogs were evaluated in this study. The samples were chosen to include as wide a range of pathological samples as possible. The differential white cell counts of the Cell-Dyn 3500 were compared to a manual differential white cell count method prescribed by the National Committee for Clinical Laboratory Standards.

Conclusions derived from the investigation are as follows:

The total white blood cell counts of the Cell-Dyn 3500 and that of the Baker System 9000 compared favourably, with a correlation coefficient of 0.989.

The neutrophil counts of the Cell-Dyn 3500 compared well to the manual neutrophil counts, with a correlation coefficient of 0.981.

The lymphocyte counts of the Cell-Dyn 3500 compared reasonably, but not very well to the manual lymphocyte counts (correlation coefficient 0.782), although the results in this study were slightly better than the manufacturer's claims for canine lymphocyte counts, which is >0.70.

The monocyte counts of the Cell-Dyn 3500 compared very poorly to the manual monocyte counts (correlation coefficient 0.097), which is in agreement with the manufacturer's absence of a claim for correlation.

The eosinophil counts of the Cell-Dyn 3500 compared very poorly to the manual eosinopil counts (correlation coefficient 0.304), which is in contradiction to the manufacturer's claim of >0.70.

The basophil counts of the Cell-Dyn 3500 showed no correlation with the manual basophil counts (correlation coefficient 0.0000), which is in line with the manufacturer's absence of a claim for correlation.

The flags given by the Cell-Dyn 3500 did not compare well with comments made by the examiners, with the exception of flags for nucleated red blood cells, where there was agreement in 73.13% of the cases. The identification of immature neutrophils was also reasonable, with a 57.44% agreement.

The Cell-Dyn 3500 showed excellent linearity for the total white cell count, with a correlation coefficient of 0.999.

The Cell-Dyn 3500 had no detectable carry-over between samples.