A PRELIMINARY REPORT ON THE EVALUATION OF THE KONTRON MICROGROUPAMATIC

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Introduction

A preliminary evaluation of the Kontron Microgroupamatic was performed at the London Hospital, Whitechapel during the month of January 1985. The system was evaluated for reading of results of ABO, D typing and antibody screening.

Description of the instrument

The Microgroupamatic system consists of a microplate photometer, a Digital Equipment Corporation microcomputer for data processing (floppy disc based), a video terminal, a printer and optional codabar reader, and automatic plate loader.

The instrument interprets micro well hemagglutination reactions by taking several readings from different positions in each well. Interpretation is made from the central reading and the contrast value which is the difference between the highest and lowest readings. The operator can select the three best steps for obtaining the photometric readings of each well by the standardization procedure. This is required for each new batch of antisera, or if the manufacturer of the microtitre plate is changed.

One microplate containing eight patient samples can be read in approximately one minute. The blood group and antibody screen interpretation and parameter settings are software controlled by the operator. There is also a graphic data analysis for daily quality control of cell concentrations and antisera performance.

The option of the barcode reader can be used for plate identification and the correlation of reactions to each sample. Alternatively each individual row in the plate can be given a laboratory number via the software programme prior to reading the plate. There is also a communications package for data transmission to a host computer, but this function could not be evaluated.

Work throughout time as based on photometric reading, interpretation and “on line editing of results” is approximately 5 minutes per plate, consisting of 8 samples. The cost of the system is approximately £20,000 depending on which optional extras are required. The system can be incorporated into a bench space of 20 square feet.
Evaluation

A total of 600 samples were tested in duplicate with routine microhemagglutination techniques, and a further 825 were tested with the Microgroupamatic incorporated into the routine work.

The Microgroupamatic was initially calibrated as per instruction manual, with slight changes to the threshold values as a broad spectrum of samples were tested. The analysis and interpretation tables were set up to operator specifications, and the following set of analyses were selected: ABO, Rhesus D, antibody screen, auto reaction.

An interpretation table was set up for each individual analysis. The symbol 0 is used where the results of that particular well are not to be included in the interpretation. Positive or negative reactions are indicted by + or − symbols. The symbol M can be incorporated if an interpretation using weak positive reactions was desired.

The cycle and threshold tables were set up with the same microtitre plates, cell concentrations, and dilutions of antisera used throughout. Two manufacturers of microtitre plates were tested i.e. Nunc and Kontron, both gave similar results. All plates were soaked in 0.1% albumin/saline and shaken dry before use to reduce problems of static electricity. The plates were reused three or four times after soaking in a neutral detergent and rinsing in distilled water. The plates were discarded if any wells were badly scratched or occluded.

Blood Group Reference Laboratory (BGRL) antisera was used throughout, incorporating monoclonal anti-A and anti-B which could be diluted for use 1:5 and 1:32 respectively. Human anti-A + B was diluted to 1:2 and the two human IgG anti-D’s were used undiluted. A cell concentration of 3% was used throughout. The standard A1, A2, and B cells were made up to an accurate 3% in 0.1% bromelin/saline. The patient’s cells were diluted to approximately 3% by visual comparison. The recommended use of anticoagulated samples was not followed because of the extra expense incurred of having two samples i.e. one clotted and one anticoagulated, and the inevitable increase in sampling error.

Antibody screening consisted of two screening cells issued by the BGRL cells 1 and 11, suspended in 0.1% bromelin/saline. The indirect antiglobulin technique was performed in the microtitre plates but was read visually because the type of agglutination produced is not suitable at present for reading by the photometer.

Test and standard cells were premodified for 10 minutes in the bromelin before testing. All tests were performed with 25 µl volumes and incubated for 20 minutes at R.T. before spinning at 110 g for 40 seconds. The plates were then agitated using a Titertek plate shaker based on orbital movement, until the negative reactions were evenly resuspended. In practice gentle agitation for 2 minutes was required, followed by the lowest speed rotation to keep the cells suspended before reading. It is important that the reactions are not allowed to settle prior to reading and for this reason it was found impractical to use the automatic plate feeder which takes a stack of 10 plates.