

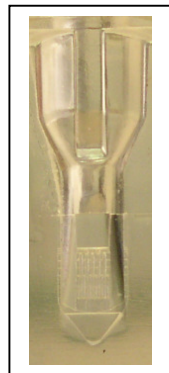
NEW FORMAT FOR BLOOD GROUP SEROLOGY DIAGNOSTICS*

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Background: Gel and Column agglutination techniques are well established in blood group serology diagnostics. Ease of handling, stable endpoint, and no need for washing steps in the indirect Antiglobulin Test (IAT) are key strengths of these systems [1,2]. However, weak positive results are sometimes difficult to discern from negatives.

The purpose of this study was to develop an agglutination format with distinct areas for positive and negative reactions, which allows for an IAT without washing steps.

Methods: A plastic chip, similar in size with an ID-Microtyping Card (DiaMed), containing an intrinsic microcapillary system, was constructed with a top to bottom design as shown in **Figure 1**:



- 1) Reaction chamber
- ↓
- 2) Reagent channel
- ↓
- 3) Capillary system
- ↓
- 4) Flash-shaped chamber

The capillary zone and the flash-shaped chamber are the compartments of positive and negative reactions, respectively.

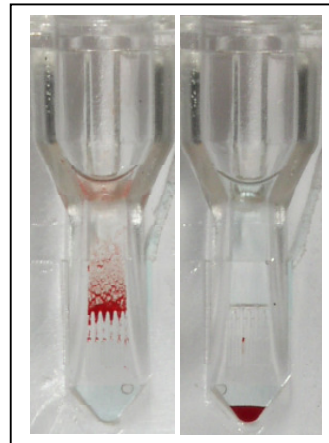


Figure 2: Capillary centrifugation tube with typical results. Note the interface between positive and negative area in the upper part of the negative chamber.

Forward Typing: 10 μ l of diluted whole blood are pipetted into the reaction chamber of a chip carrying reagent channels filled with anti-A or anti-B reagent. The chip is centrifuged in an ID-Centrifuge.

Antibody Screening with IAT: 50 μ l of 0.8 % Screening Cells and 25 μ l of patient plasma are pipetted into the reaction chamber of a chip containing Coombs reagent. The chip is incubated for 15 minutes at 37 °C and then centrifuged in an ID-Centrifuge for 10 min.

Positive and negative results are recognized as hemagglutinates that are retained within the capillary system or as a button of red cells in the negative chamber (see fig.2).

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Results: 20 blood samples have been tested in a prototype chip containing anti-A or anti-B reagent. 10 patient plasma containing irregular antibodies against blood group antigens and 10 plasma of blood donors without detectable irregular antibodies have been tested in a prototype Coombs chip. All results were in agreement with the results received with similar ID-Cards.

Conclusions: The results of this feasibility study indicate that the here presented capillary centrifugation technique may have the following advantages in comparison to gel and column agglutination techniques:

1. **Negative and positive area:** Easier interpretation of very weak positive reactions
2. **Reduced lot-to-lot variances.**
3. **Lower reagent consumption**
4. **Shorter centrifugation.**
5. **Flexibility:** can be used with empty cards in an automated workstation, where the reagents are added in a first step according to the specific needs of the customer.
6. **Platform technology:** Suitable for particle agglutination tests by using ligand-coated standard synthetic particles with a relative density of 1.05.

References:

- [1] Lapierre Y, Rigal D, Adam J, Josef, D, Meyer F, Greber S, Drot C: The gel test: a new way to detect red cell antigen-antibody reactions. *Transfusion* 1990; 30: 109-113.
- [2] Rumsey DH, Ciesilski DJ: New protocols in serologic testing: a review of techniques to meet today's challenges. *Immunohematology* 2000;1:131-137.