

ABO-IDENTITY TEST FOR PRETRANSFUSION BEDSIDE TESTING IN A LATERAL FLOW DEVICE*

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Purpose: Most fatal complications of blood transfusion are due to errors occurring at the patient bedside. Therefore, ABO-Identity testing at the bedside is mandatory in several countries (Germany, France, Austria).

The purpose of this study was to develop a user friendly bedside test (few manipulations, reduced exposure to bio-hazardous material, simple interpretation of the results).

Methods: A lateral flow device was designed with two separation membranes (for the testing of two recipients or one recipient and one blood bag segment, respectively) in a cassette housing. Each membrane has an application zone and a detection area printed with parallel lines of antibody reagents directed against blood groups A and B.

A buffer reservoir with a simple drop mechanism is physically connected to the device in order to assure that all material necessary for the tests is always in place.

40 EDTA-bloods and 10 segment bloods with known blood group AB status were tested in the new device.

Results: From 40 EDTA-blood samples tested (10 each of blood group A, B, AB, O, including Ax), all blood types were identified correctly. A typical test result is shown in the figure.

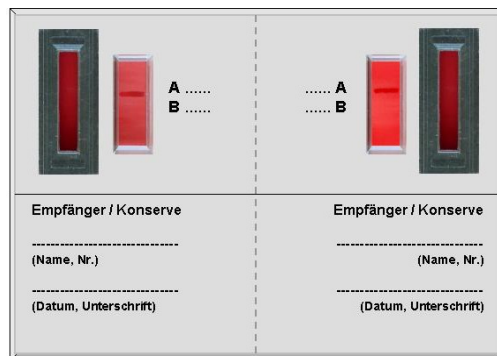


Figure: Lateral flow device for ABO-Identity testing. **Left:** EDTA-blood ("recipient", blood group A. **Right:** segment blood ("donor"), blood group A.

Test procedure:

1. **Add 1 drop (50 µl) of patient or segment blood into the application zone of the device.**
2. **Add 2 drops (100 µl) of wash solution.**
3. **Move the card gently back and forth for 5 seconds.**
4. **Read and record results after 2 minutes.**

(Positive results are recognized as distinct red bands, negatives by the absence of the respective band)

Conclusions: The presented ABO identity test is simple to perform (two pipetting steps). Band-shaped stable end-point results facilitate interpretation. Both criteria may help to reduce the risk of bedside testing errors. The closed and needle-less system minimizes the risk of injury and contamination for the nurse who is performing the test.

Outlook: A concept is proposed which combines the ABD control of the blood bag in the laboratory with ABO-Identity testing at the patient bedside.

For this purpose, we propose a card composed of an **ABD-Confirmation area** with 4 parameters (A-B-D-autocontrol) and an **ABO-Identity area** with 2 parameters (A-B). The card can be attached irreversibly to the blood bag.

The segments of incoming blood bags are tested in the laboratory utilizing the ABD part. The chip is then attached to the blood bag, which is stored refrigerated, until it is required for transfusion. The nurse performs the bedside test with a patient sample utilizing the second (ABO-)part of the chip.

With this concept: **1)** The events of transfusion become a coordinated interaction between laboratory technician and nurse. **2)** The ABD control done by the laboratory and the labelling of tested blood bags become part of an integral process. **3)** The nurse is liberated from the organization of the materials for bedside testing. **4)** The result of patient bedside tests can be compared with the physically present result provided by the laboratory. **5)** Errors at the patient bedside are minimized due to the physical connection of blood bag and bedside test.

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