**PERINATAL**

# Does your labororatory still overestimate fetomaternal hemorrhage?

## Prevent overtreatment of FMH

In the majority of the clinical laboratories the Kleihauer Betke method, an acid elution (AE) method, is used to determine the degree of fetomaternal hemorrhage (FMH). This method is highly laborious and prone to produce fluctuating results. Besides, the AE method is unable to distinguish fetal red blood cells (RBCs) containing fetal hemoglobin (HbF) from maternal cells harboring hemoglobin F (F cells). This, in turn, increases the risk of false positive results thereby leading to an overestimation of the volume of FMH[1-3]. Figure 1 displays representative results of various samples analyzed by flow cytometry.

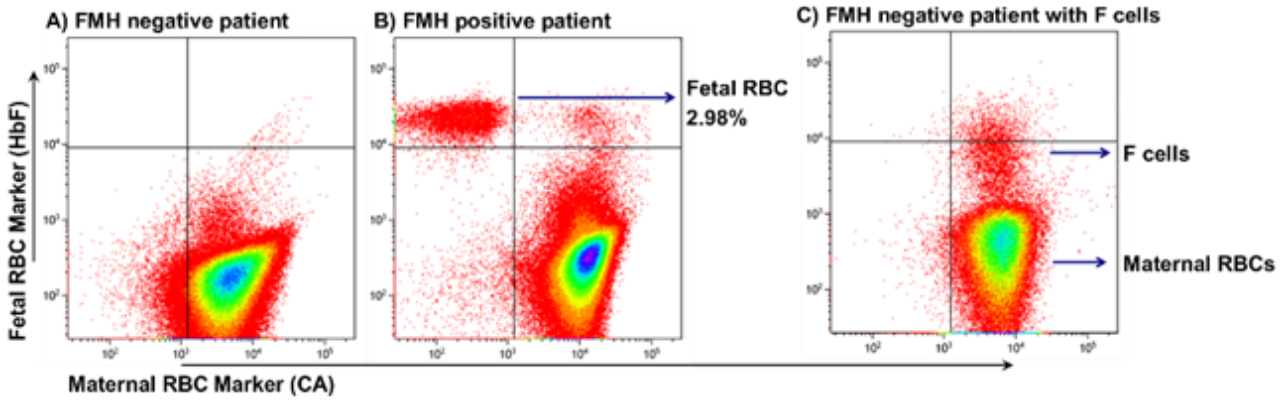


***Figure 1*** | *Representative results of the **Fetal Cell Count™ kit** obtained with peripheral blood samples from pregnant woman suspected of FMH. **A.** FMH negative patient sample. **B.** FMH positive patient sample with maternal F cells. Fetal RBCs are clearly separated from the maternal F cells due to the use of the maternal RBC marker Carbonic Anhydrase (CA). **C.** Maternal F cells (F cells) and mature RBCs (Maternal RBCs). The F cells could be marked as HbF positive with the AE method, while no actual HbF positive cells of fetal origin were detected in this sample.*

## Flow cytometry gives more accurate and reproducible results

It was recently established by flow cytometry that AE overestimates FMH owing to its inherent inability to distinguish between fetal RBCs and maternal F cells[1]. The authors of this study concluded that an F cell population of 16% resulted in a 3% overestimation of FMH in their study population as measured by AE. The presence of F cells in the maternal circulation during pregnancy remains enigmatic. However, the false positive results generated by the AE method are a serious reason for concern because F cell-containing pregnant women are unnecessarily worried and unnecessarily treated[4].

Flow cytometry is the method of choice to determine the level of FMH, because of its ability to distinguish between fetal erythrocytes and maternal F cells. The resolving power of this approach is obtained by the combination of an antibody against HbF with an antibody against carbonic anhydrase (CA). CA is highly expressed in adult erythrocytes unlike fetal erythrocytes and this, therefore, improves the separation of fetal and maternal erythrocytes[4,5].


**References**

1. Corcoran D, et al. Blood Transfus. 2014 Oct;12(4):570-4
2. Pastoret C, et al. Cytometry B Clin Cytom. 2013;84(1):37-43
3. Chen J, et al. Cytometry B Clin Cytom. 2002; 50:285-290
4. Frielink L, et al. NTOG. 2014; v127 (Dutch)
5. Porra V, et al. Transfusion, 2007;47:1281-1289


## Product details

| Item | Description | Size | Product code |
|---|---|---|---|
| Fetal Cell Count™ kit IVD CE | Complete assay for routine diagnosis of fetomaternal hemorrhage using anti-HbF and anti-CA | 25 tests | IQP-363 |
| FMH QuikQuant IVD CE | Rapid assay for fetomaternal hemorrhage quantification | 100 tests | QQF-100 |
| FMH Kit [1] IVD CE | FITC conjugated Anti-RhD reagent for determination of fetomaternal hemorrhage | 100 tests | 9447 |
| FETALtrol™ [2] IVD CE and FDA cleared | Tri-level stabilized blood controls with known human fetal erythrocytes content in human adult blood | 2x 2 mL vials each level | FH101 |
| | | 1x 2 mL vial each level | FH102 |

IVD CE in vitro diagnostic medical device. The products are registered as IVD in the countries belonging to the European Union

[1] Distributed outside the UK for IBGRL, Bristol, UK

[2] Distributed for R&D Systems, USA


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