

Digital Blood Smear Analysis EQA Scheme Guidelines

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Steering committee of the EQALM Virtual Microscopy Working Group

Introduction

The main objective of the EQALM Virtual Microscopy Working Group (VM WG) is to setup an EQALM VM Sharing Platform of digital slides/digital sample images and associated applications under the auspices of EQALM in cooperation with the University of Szeged.

The main benefit is the possibility for the EQALM members to share survey results and expertise, have comparable statistics and even organise joint surveys.

To that purpose, the schemes have to be standardized. The EQALM VM WG Steering Committee has setup a proposal for a standardised Digital Blood Smear Analysis EQA Scheme. This proposal concerns both counting and morphology analysis of digital blood smears using a virtual microscope.

It has been structured into four main sections: case description, slide analysis, interpretation of the slide analysis, quality of the digital smear and usability of the technical environment.

For each of these sections, a set of parameters has been defined according to the existing different schemes of the EQALM members and international recommendations. The VM WG Steering Committee has proposed mandatory parameters common to all schemes and optional parameters for personalized schemes. Optional parameters names start with asterisk and are in italic.

Conclusion

An implementation of the standardised scheme has been realized and it will be tested in a pilot study by volunteer VM WG members.

The list of the mandatory and optional parameters is not final and will be adapted according to the pilot study results but also to the standardisation of the statistical treatments and reporting which are under development.

A. Case description

This section provides information to the survey participants about the digital slide (patient, tests ...)

Gender

Age

** Clinical information*

** Complete blood count*

** Partial blood count*

** Blood, serum or plasma tests*

B. Slide analysis

This section contains the parameters to be determined on the virtual slide (see Figure 1).

The parameters have been splitted into two levels:

1. Cellular level. The advantage of virtual microscopy is that observed elements can be identified and marked individually. The marked elements thus have one type and several attributes. They are evaluated at a cellular level. The attributes depend on the type of the observed element. The corresponding dependencies are presented on Figure 1.
2. Smear level. Some characteristics are evaluated for the whole smear. There are based on a global observation of the smear not on individual characteristics of cellular elements mainly for time issues. As an example, anisocytosis is evaluated on a visual estimation of the size distribution of the cells although individual measurement could be performed automatically or manually.

C. Interpretation (of the slide analysis)

This section includes morphology findings interpretations (WBC, RBC, platelets and overall) and the final interpretation of the case.

C.1 Morphology findings interpretation

Select the most important findings max. 5 items

C.2 Final interpretation

Normal

Abnormal

Not interpretable

** Interpretation to be refined in an external laboratory*

** Diagnosis codes of haematologic deviations*

** WHO codes of haematologic deviations*

D. Usability

This section is about the usability/quality of the digital smear and the evaluation of the technical environment.

D.1 Smear quality

Satisfactory

Acceptable, usable

Unsatisfactory

D.2 Smear staining quality

Satisfactory

Acceptable, usable

Unsatisfactory

D.3 Image resolution (magnification)

** Satisfactory*

** Acceptable, usable*

** Unsatisfactory*

D.4 Size of the digitised smear

** Satisfactory*

** Acceptable, usable (satisfactory in some zones)*

** Unsatisfactory*

D.5 Optical clarity of the digital smear

** Satisfactory (all cells have the right focus level)*

** Acceptable, usable (some cells are blurry, some zones need adjusted focus level)*

** Unsatisfactory*

D.6 Image contrast

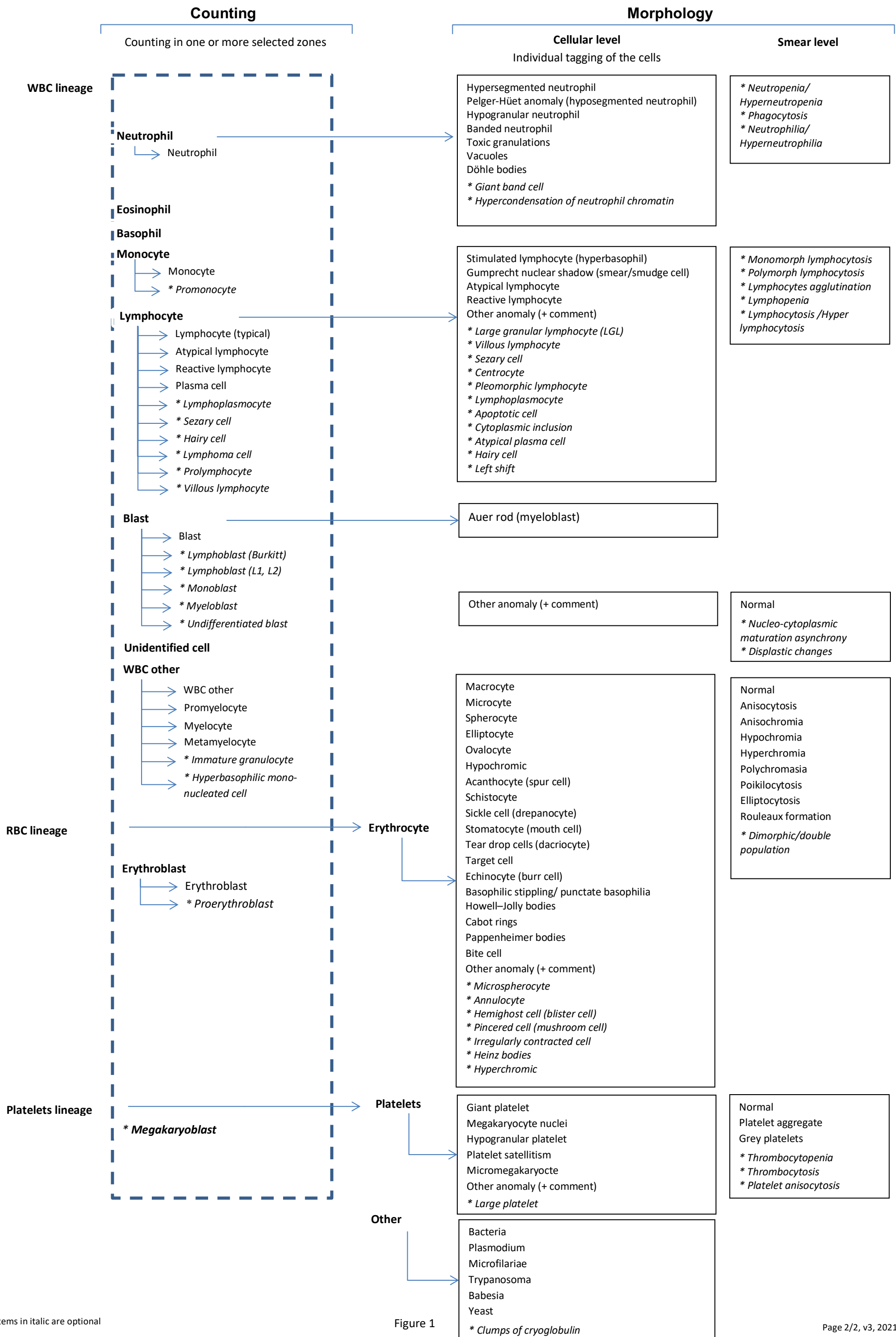
** Satisfactory*

** Acceptable, usable*

** Unsatisfactory*

Digital Blood Smear Slide Analysis

Parameters and dependencies



* Items in italic are optional

Figure 1