



## Letter to the Editor

### The Significance of Purity: Leukaemias Involving the Erythroid Lineage

**Keywords:** Acute leukemia; WHO classification; Erythroid leukemia.

**Published:** November 1, 2020

**Received:** September 22, 2020

**Accepted:** October 9, 2020

**Citation:** Liso V., Liso A., Zini G. The significance of purity: leukaemias involving the erythroid lineage. *Mediterr J Hematol Infect Dis* 2020, 12(1): e2020077, DOI: <http://dx.doi.org/10.4084/MJHID.2020.077>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by-nc/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### To the editor.

To clarify the area of diagnostic uncertainty of acute leukaemias involving the erythroid lineage, in 2016, Arber et al. revised the acute myeloid leukemia not otherwise specified subtype (AML-NOS) in the book of WHO classification of tumours of haematopoietic and lymphoid tissues.<sup>1</sup>

Significantly, the authors revised the blast counting schema and indicated a precise cut-off. In particular, some cases previously classified as erythroleukemia (erythroid/myeloid type), in which erythroid precursor cell constitute  $\geq 50\%$  of bone marrow cellularity and myeloid blasts  $< 20\%$  of the total marrow or peripheral blood cells, were assigned to the group of myelodysplastic syndromes (MDS). Moreover, cases with myeloid blasts representing  $\geq 20\%$  of the cells were defined as acute myeloid leukaemia with myelodysplastic related changes (AML-MRC) irrespective of the erythroid cell count. So in those conditions, the number of blasts determined the assignment to either MDS or AML-MRC category.

In chapter 1 of the same WHO book (named "Introduction and overview of the classification of myeloid neoplasms"), in table 1.01 entitled "Diagnostic approach to myeloid neoplasms in which erythroid precursors constitute  $\geq 50\%$  of the nucleated bone marrow cell", the term "pure erythroid leukemia" (PEL) is assigned to cases displaying  $> 80\%$  immature erythroid precursors with  $> 30\%$  proerythroblasts, myeloblasts being  $< 20\%$ . This definition does not exclude, in principle, the presence of a minor component of myeloblasts.

Notably, the diagnosis of PEL, according to the same authors (page 161, column 2, line 16), requires the presence of a "neoplastic proliferation of immature cells (undifferentiated or proerythroblastic in appearance) committed exclusively to the erythroid lineage ( $> 80\%$  of the bone marrow cell are erythroid with  $\geq 30\%$  proerythroblasts) with no evidence of significant

myeloblastic component".<sup>1</sup>

The term "non-significant myeloblastic component" was not translated in any quantitative measure. However, the term "non-significant myeloblastic component", it is in our opinion rather indefinite, as it is not related to any inherent characteristic of the blasts, but rather to the significance one can attribute to them. Some hematologists may interpret the term "non-significant" as negligible myeloblastic component, others to the presence of a measurable but non-clonal proportion of myeloblasts.

The importance of quantifying the number of bone marrow blasts, however, is underlined as important prognostic variable in MDS cases, in fact the revised international prognostic scoring system (IPSS-R) score values for MDS, considers a very good prognosis patients' samples showing  $\leq 2\%$  of blasts versus a good prognosis for those showing between 2% and 5% myeloid blasts.<sup>2</sup>

Therefore is not clear, in the context of the 2016 WHO classification, how a patient with  $> 80\%$  erythroid precursors (and  $\geq 30\%$  proerythroblasts) should be classified in the presence of a bone marrow proportion of myeloid blasts between 5 and 19%. So, we suggest that the presence of a minimal number of blasts should always be reported and evaluated before formulating a definite diagnosis of neoplastic haematologic diseases.

In conclusion, in our opinion the word "pure" is misleading in cases of leukemia in which we observe immature erythroid cells with  $> 30\%$  of proerythroblast (currently named PEL in the WHO classification), in the presence of a variable proportion of potentially clonal myeloid blasts. We therefore suggest eliminating the word "pure" and simply calling these cases as "erythroid leukemia". Further studies could hopefully evaluate if and how the presence of "a significant myeloblastic component" has a clinical and prognostic meaning in such erythroid leukemias.

Vincenzo Liso<sup>1</sup>, Arcangelo Liso<sup>2</sup> and Gina Zini<sup>3</sup>.

<sup>1</sup> University of Bari, Bari, Italy.

<sup>2</sup> Department of Medicine and Surgery, University of Foggia, Foggia, Italy.

<sup>3</sup> Fondazione Policlinico Universitario A. Gemelli IRCCS - Istituto di Ematologia, Università Cattolica del Sacro Cuore, Rome, Italy.

**Competing interests:** The authors declare no conflict of Interest.

Correspondence to: Arcangelo Liso, MD PhD. Department of Medicine and Surgery, University of Foggia, Foggia, Italy.

E-mail: [arcangelo.liso@unifg.it](mailto:arcangelo.liso@unifg.it)

---

## References:

1. Arber D.A., Brunning R.A., Orazi A., et al. Acute Myeloid Leukemia, NOS in Swerdlow S.H., Campo E., Harris N.L., et al in WHO classification of tumours of haematopoietic and lymphoid tissues : pag 156-162 International Agency for Research on Cancer (IARC) Lyon, 2017
2. Greenberg P.L., Tuechler H., Schanz J., et al. Revised international prognostic score system for myelodysplastic syndromes Blood 2012 ; 120(12),2454-2465  
<https://doi.org/10.1182/blood-2012-03-420489>  
PMid:22740453 PMCID:PMC4425443