AgNOR staining in normal bone marrow cells

We were pleased to read that in their article Nikicizic and Norbeck emphasised the importance of the differential morphological expression of AgNORs using their own classification. 1 Their system, with eight types of AgNORs, appears as a complex classification system and could also raise the intra- and interobserver variability.

We have also recently studied AgNORs in normal bone marrow cells 2 differentiating only the following groups: clusters of NORs within a matrix; small dots within the nucleoplasm; and rouched argyrophilic structures corresponding to a small nucleolus. 3 The intra- and interobserver variability were less than 10%. A characteristic pattern of clusters or dots, or both, could be seen in each cell type. Clusters were only present in proliferating cells. The number of dots was lowest in the most immature cells, increased initially with maturation, but decreased as the final maturation to the end stage cell took place. Thus our quantitative analysis suggests a difference between dots and clusters also on a physiological level. 2,3

Hansen and Østergård proposed another classification system that is basically based on the differentiation in dots and clusters. 3 Interestingly, it was noted that dots predominated in hyperplastic prostatic tissue; the subtypes of clusters (with one exception) were only observed in intraepithelial neoplasia and carcinoma of the prostate.

In conclusion, we feel that the validity of a morphological classification system should be measured by its physiological or pathophysiological importance. 2,3

From the above, it is clear that there is a need for a reliable and valid classification system. In our opinion, the latter should include the study of the number of AgNORs per cell, the size of the clusters, the number of clusters per cell, and the number of dots per cell. 2,3

We agree that further studies of AgNORs in bone marrow cells in various physiological and pathological conditions should be undertaken. The complexity of the AgNOR system may indeed allow modifications of the system to describe such cells.

References


Drs Nikicizic and Norbeck comment:

We are pleased that our article has stimulated interest and thank Drs Metze and Lorand-Metze for their comments.

Our system of AgNOR structures and the non-AgNOR staining features allows recognition of a wide spectrum of patterns and characterises all types of normal bone marrow cells at various levels of maturation.

In the study we used air-dried smears of bone marrow aspirates. This preparation flattens the cells on the coverslip, allowing maximum spreading and good bidimensional assessment of cellular features. The structural variability due to orientation of the cell is therefore minimal compared to the variability in preparations of immediately fixed cells or histological sections. The systems of describing AgNORs cited by Drs Metze and Lorand-Metze apply to histological sections and take into account the smaller AgNOR subunits within larger AgNOR clusters or structures. In our preparations of whole cells, subunits were not well visualised. Instead, we incorporated the shape of AgNOR structures into a system which also uses size and number of the structures.

We agree that further studies of AgNORs in bone marrow cells in various physiological and pathological conditions should be undertaken. The complexity of the AgNOR system may indeed allow modifications of the system to describe such cells.