



**INCIDENTAL CIRCULATING MEGAKARYOCYTE IN A NORMAL PERIPHERAL BLOOD SMEAR: A RARE MORPHOLOGIC FINDING IN AN ASYMPTOMATIC ADULT FEMALE**

\*<sup>1</sup>Ruba Abed, MD, <sup>2</sup>Tala Mohammad, MD

<sup>1</sup>MedLabs Consultancy Group, Amman, Jordan.

<sup>2</sup>Jordan University Hospital, Amman, Jordan.



\*Corresponding Author: Ruba Abed, MD

MedLabs Consultancy Group, Amman, Jordan.

DOI: <https://doi.org/10.5281/zenodo.19413676>



**How to cite this Article:** \*<sup>1</sup>Ruba Abed, MD, <sup>2</sup>Tala Mohammad, MD. (2026). Incidental Circulating Megakaryocyte In A Normal Peripheral Blood Smear: A Rare Morphologic Finding In An Asymptomatic Adult Female. European Journal of Biomedical and Pharmaceutical Sciences, 13(4), 346–348.

This work is licensed under Creative Commons Attribution 4.0 International license.

Article Received on 05/03/2026

Article Revised on 25/03/2026

Article Published on 04/04/2026

### ABSTRACT

Megakaryocytes are large bone marrow–derived hematopoietic cells responsible for platelet production and are normally confined to the bone marrow microenvironment. Their presence in peripheral circulation is extremely uncommon and is typically associated with pathological conditions such as myeloproliferative neoplasms, marrow infiltration, or severe bone marrow stress (1–3). We report an incidental finding of a circulating megakaryocyte in the peripheral blood smear of a 35-year-old female who presented for routine laboratory evaluation. Complete blood count parameters were within normal reference ranges, and the patient had no clinical symptoms or relevant medical history. Peripheral blood smear examination revealed a single large cell demonstrating morphological features consistent with a megakaryocyte, including abundant cytoplasm and a multilobulated nucleus. Repeat hematological evaluation showed normal findings with no recurrence of the megakaryocyte. This case highlights the continued importance of careful microscopic examination of peripheral blood smears and illustrates that rare circulating megakaryocytes may occasionally be detected in otherwise healthy individuals.

**KEYWORDS:** Megakaryocyte, Peripheral Blood Smear, Rare Morphology, Hematology, Platelet Biogenesis

### INTRODUCTION

Megakaryocytes are large polyploid hematopoietic cells derived from hematopoietic stem cells within the bone marrow and are responsible for platelet production through cytoplasmic fragmentation and proplatelet formation.<sup>[1,4]</sup> Under normal physiological conditions, megakaryocytes remain confined to bone marrow and release platelets into marrow sinusoids before they enter the systemic circulation.<sup>[2,3]</sup>

The presence of intact megakaryocytes in peripheral blood is considered highly unusual and is most often associated with hematologic disorders such as myeloproliferative neoplasms, primary myelofibrosis, acute leukemia, or marrow infiltration.<sup>[1-3]</sup> In such disorders, abnormal megakaryopoiesis or disruption of marrow architecture may facilitate premature release of megakaryocytes into circulation.

However, rare incidental cases of circulating megakaryocytes have been reported during peripheral smear examination in individuals without underlying hematologic disease.<sup>[6]</sup> Recent studies have also demonstrated that megakaryocytes may migrate into pulmonary circulation, where platelet production can continue within lung vasculature.<sup>[5,7]</sup>

Here we report a rare incidental detection of a megakaryocyte in the peripheral blood smear of an asymptomatic adult female with completely normal hematological parameters.

### MATERIALS AND METHODS

#### Patient Information

A 35-year-old female presented to the clinical laboratory for a routine health checkup. She reported no symptoms and had no significant past medical history, chronic illness, or recent infection.

Physical examination was unremarkable, with no pallor, lymphadenopathy, or hepatosplenomegaly.

### Sample Collection

Peripheral venous blood was collected in an **EDTA anticoagulated tube** following standard phlebotomy procedures.

### Hematological Analysis

Complete blood count (CBC) analysis was performed using an automated hematology analyzer. The following parameters were assessed:

- Hemoglobin concentration
- Red blood cell count
- Hematocrit

- Red cell indices (MCV, MCH, MCHC, RDW)
- Total leukocyte count
- Differential leukocyte count
- Platelet count

### Peripheral Blood Smear Preparation

Peripheral blood smears were prepared using the wedge technique and stained with **Wright–Giemsa stain**. Slides were examined under light microscopy followed by detailed evaluation under **oil immersion (1000×)** for morphological assessment of blood cells.<sup>[6]</sup>

Repeating CBC and smear examination were performed two weeks later to exclude transient abnormalities.

## RESULTS

### Hematological Parameters

All hematological parameters were within normal reference ranges

| Parameter      | Result                          | Reference Range                            |
|----------------|---------------------------------|--|
| Hemoglobin     | 13.4 g/dL                       | 12–16 g/dL                                 |
| RBC Count      | $4.55 \times 10^6 /\mu\text{L}$ | $4.0\text{--}5.2 \times 10^6 /\mu\text{L}$ |
| Hematocrit     | 40.1 %                          | 36–46 %                                    |
| MCV            | 88.2 fL                         | 80–100 fL                                  |
| MCH            | 29.4 pg                         | 27–33 pg                                   |
| MCHC           | 33.3 g/dL                       | 32–36 g/dL                                 |
| RDW            | 12.6 %                          | 11.5–14.5 %                                |
| WBC Count      | $6.8 \times 10^3/\mu\text{L}$   | $4\text{--}10 \times 10^3/\mu\text{L}$     |
| Platelet Count | $268 \times 10^3/\mu\text{L}$   | $150\text{--}400 \times 10^3/\mu\text{L}$  |

### Differential Leukocyte Count

|             |     |
|-------------|-----|
| Neutrophils | 58% |
| Lymphocytes | 34% |
| Monocytes   | 5%  |
| Eosinophils | 2%  |
| Basophils   | 1%  |

### Peripheral Blood Smear Findings

#### Red Blood Cells

Normocytic and normochromic morphology without anisopoikilocytosis.

#### White Blood Cells

Normal morphology with no blasts or dysplastic features.

#### Platelets

Adequate in number and normal morphology.

### Rare Morphologic Finding

During systematic microscopic examination, **a single large cell consistent with a megakaryocyte was identified (Figure 1).**

The cell demonstrated:

- Markedly large size relative to leukocytes
- Abundant granular cytoplasm
- Multilobulated hyperchromatic nucleus
- Nuclear lobes connected by thin chromatin bridges

No additional abnormal hematopoietic cells were identified.

Repeat hematological testing performed two weeks later showed **normal results with no recurrence of circulating megakaryocytes.**

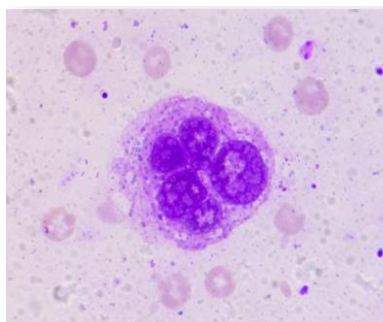
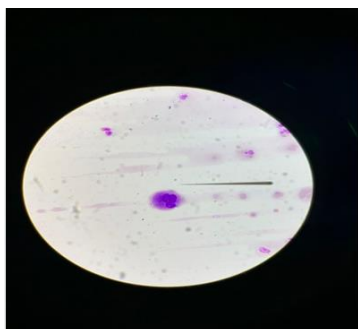


Figure 1: Circulating megakaryocyte identified in the peripheral blood smear.

Periphera blood smear stained with Wright–Giemsa stain and examined under 100x & 400x magnifications). A large cell with abundant cytoplasm and a multilobulated hyperchromatic nucleus consistent with a megakaryocyte is observed.

## DISCUSSION

Megakaryocytes are normally confined to the bone marrow, where they mature and produce platelets through cytoplasmic fragmentation.<sup>[1,4]</sup> Their presence in peripheral blood is unusual and is most frequently associated with myeloproliferative disorders or severe marrow stress.<sup>[1-3]</sup>

In pathological conditions, disruption of marrow architecture or excessive megakaryocyte proliferation may lead to premature release of megakaryocytes into circulation.<sup>[2,3]</sup> Circulating megakaryocytes have been documented in disorders such as primary myelofibrosis, essential thrombocythemia, and chronic myeloid leukemia.

Recent experimental studies have demonstrated that megakaryocytes may migrate to the pulmonary vasculature where platelet production can continue outside the bone marrow.<sup>[5,7]</sup> This physiological pathway may partially explain the occasional detection of megakaryocytes in peripheral circulation.

In the present case, the patient exhibited completely normal hematological parameters and no clinical symptoms suggesting hematologic disease. The presence of a **single megakaryocyte without accompanying abnormalities** suggests a transient and incidental phenomenon.

This case highlights the continued diagnostic value of **manual peripheral smear examination**, even in laboratories relying on automated hematology analyzers. Morphological assessment remains essential for identifying rare cellular findings that automated systems may not detect.<sup>[6,8]</sup>

## CONCLUSION

We report a rare incidental observation of a circulating megakaryocyte in the peripheral blood smear of an asymptomatic adult female with normal hematological parameters. Although megakaryocytes in peripheral blood are typically associated with hematologic disorders, isolated findings may occasionally occur in healthy individuals. Careful microscopic examination of peripheral blood smears remains an important component of hematological diagnostics.

## Ethical Approval

This case report was conducted in accordance with institutional and international ethical standards. As no identifiable patient information is included, formal institutional review board approval was not required.

## Patient Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

## Author Contributions

Ruba Abed contributed to case identification, smear evaluation, manuscript preparation, and final revision. Tala Mohammad contributed to clinical interpretation, literature review, and manuscript revision.

## Conflict of Interest

The authors declare no conflicts of interest.

## Funding

No funding was received for this study.

## REFERENCES

1. Hoffman R, et al. *Hematology: Basic Principles and Practice*. 2018.
2. Kaushansky K, et al. *Williams Hematology*. 2021.
3. Tefferi A, Barbui T. Polycythemia vera and essential thrombocythemia. *N Engl J Med.*, 2019.
4. Thon JN, Italiano JE. Platelet formation. *Semin Hematol.*, 2010.
5. Lefrançois E, et al. Platelet biogenesis in the lung. *Nature*, 2017.
6. Bain BJ. Diagnosis from the blood smear. *N Engl J Med.*, 2005.
7. Machlus KR, Italiano JE. Megakaryocyte biology and platelet production. *Blood*, 2021.
8. Riley RS, et al. Peripheral blood smear review in the era of automation. *Clin Lab Med.*, 2022.