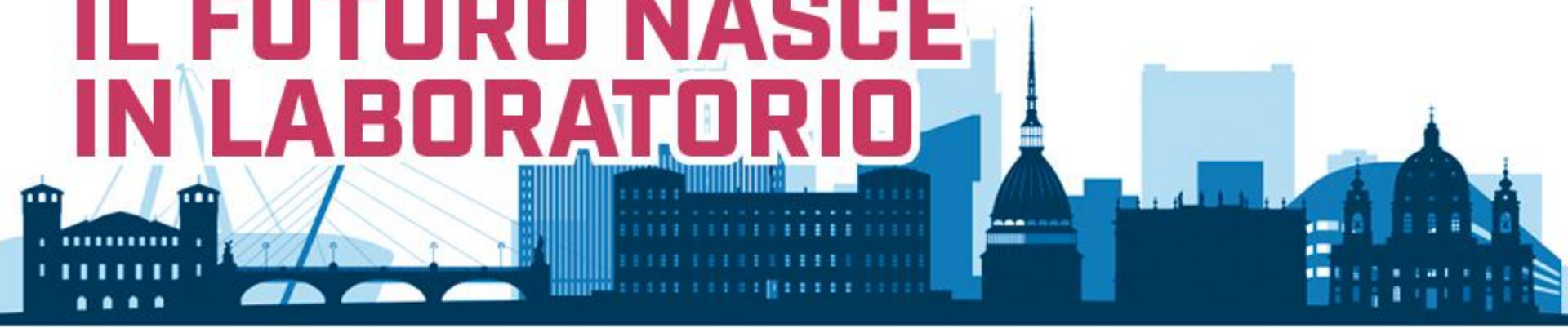
REGIONALE SIES – Delegazione Piemonte

YOUNG SCIENCE FORUM: IL FUTURO NASCE IN LABORATORIO



UBE2O AS A KEY REGULATOR OF DRUG-INDUCED ERYTHROPOIESIS IN THE CONTEXT OF MYELODYSPLASTIC SYNDROMES

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University of Turin, Dpt of Clinical and Biological Sciences

TORINO, ACCADEMIA DI MEDICINA | 4-5 GIUGNO 2026

Disclosures of Name Surname

Company name	Research support	Employee	Consultant	Stockholder	Speakers bureau	Advisory board	Other

Extensive proteome remodeling and enucleation happen during terminal erythroid differentiation resulting in highly specialized, anucleate cells known as red blood cells.

OrthoE → Erythro

Cha, H. J. Erythropoiesis: insights from a genomic perspective. Exp Mol Med ***56****, 2099–2104 (2024).*

cancers

MDPI

Review

The Ubiquitin-Conjugating Enzyme E2 O (UBE2O) and Its Therapeutic Potential in Human Leukemias and Solid Tumors

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* Correspondence: beatrice.maffeo@unito.it

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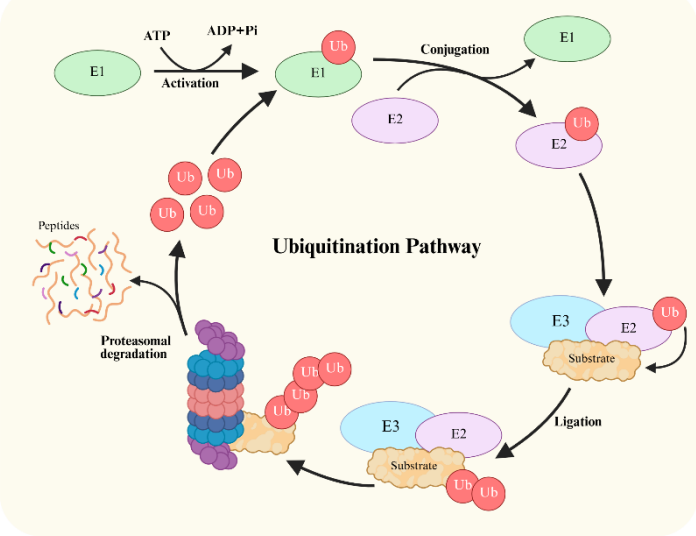

- UBE2O is an E2 enzyme
- Ubiquitination is essential for proteostasis and protein turnover
- UBE2O is involved in proteome remodelling during erythroid differentiation in mice
- Nguyen et al, https://www.science.org/doi/10.1126/science.aan0218

Induction of erythroid differentiation promotes UBE2O expression

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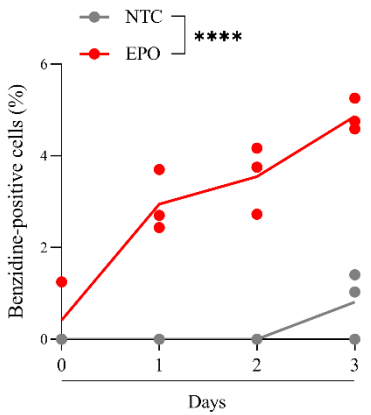

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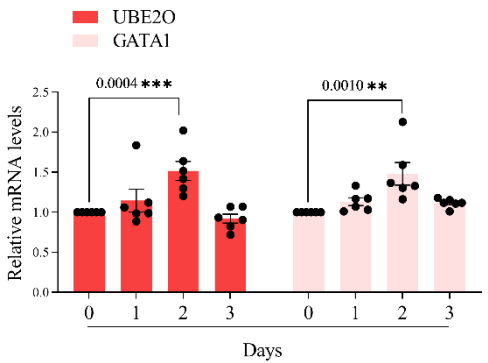

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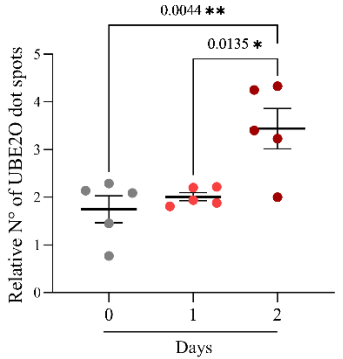

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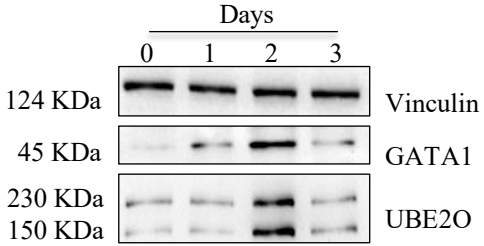
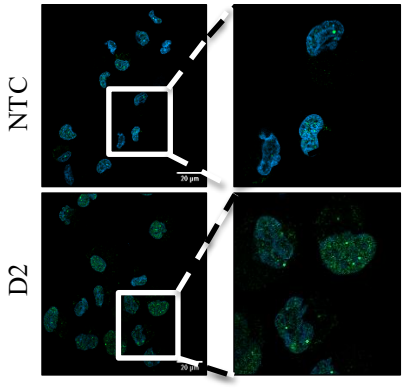
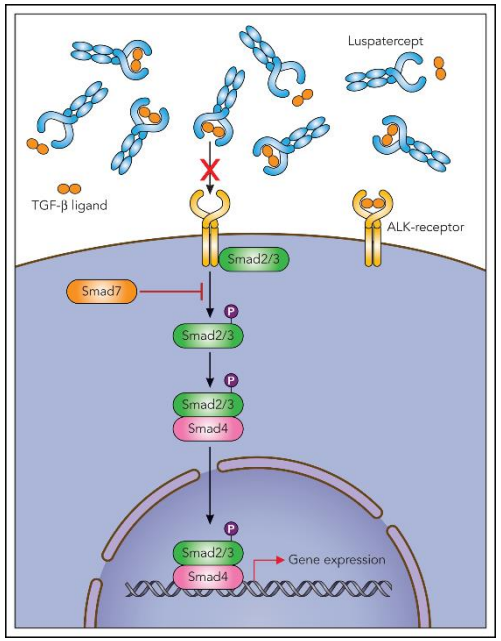




K562

Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

Luspatercept-induced erythroid differentiation promotes UBE2O expression



Kubasch AS, Fenaux P, Platzbecker U. Development of luspatercept to treat ineffective erythropoiesis. Blood Adv. 2021;5(5):1565-1575. doi:10.1182/bloodadvances.2020002177

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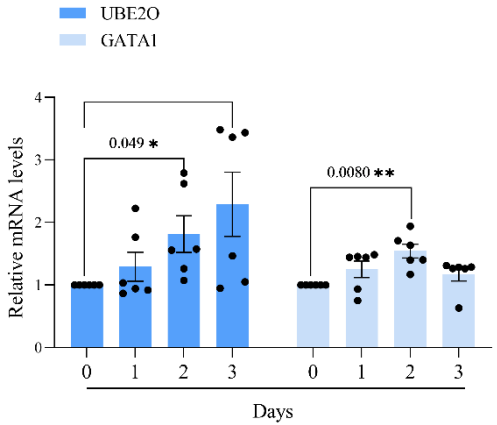

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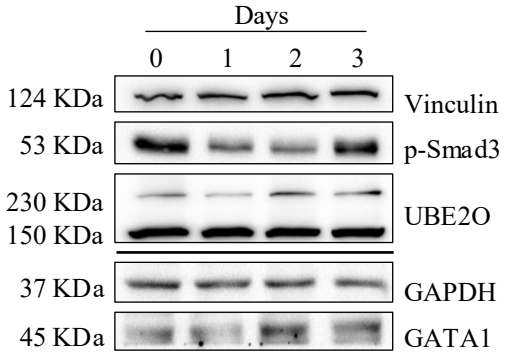

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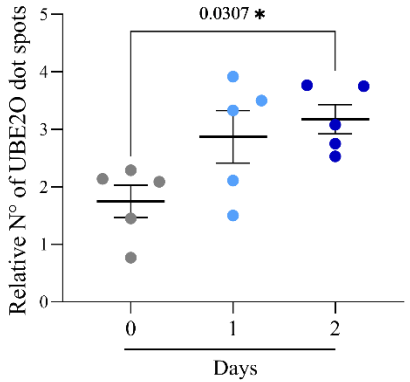

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Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

GATA1 regulates UBE2O transcription during erythroid differentiation

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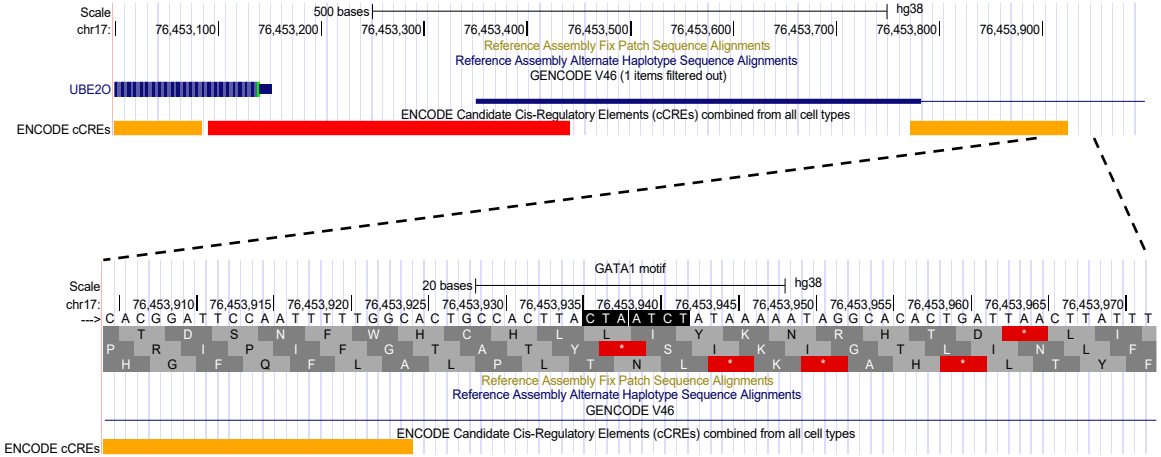

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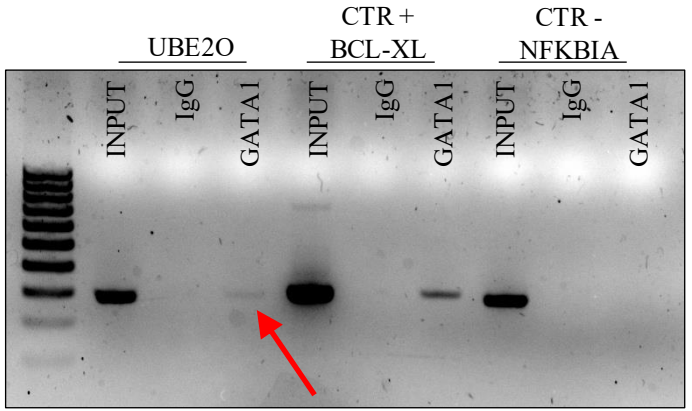


Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

K562

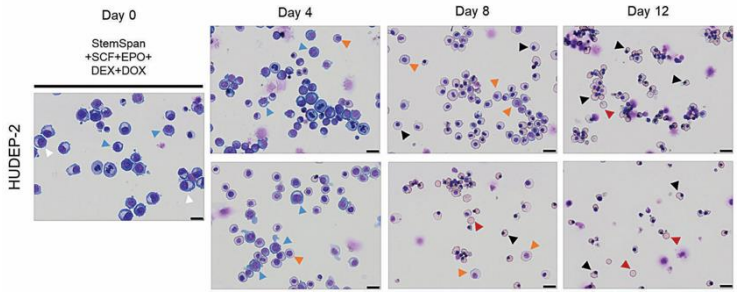
HUDEP-2 cells achieve advanced erythroid maturation

haematologica
Journal of the Ferrata Storti Foundation

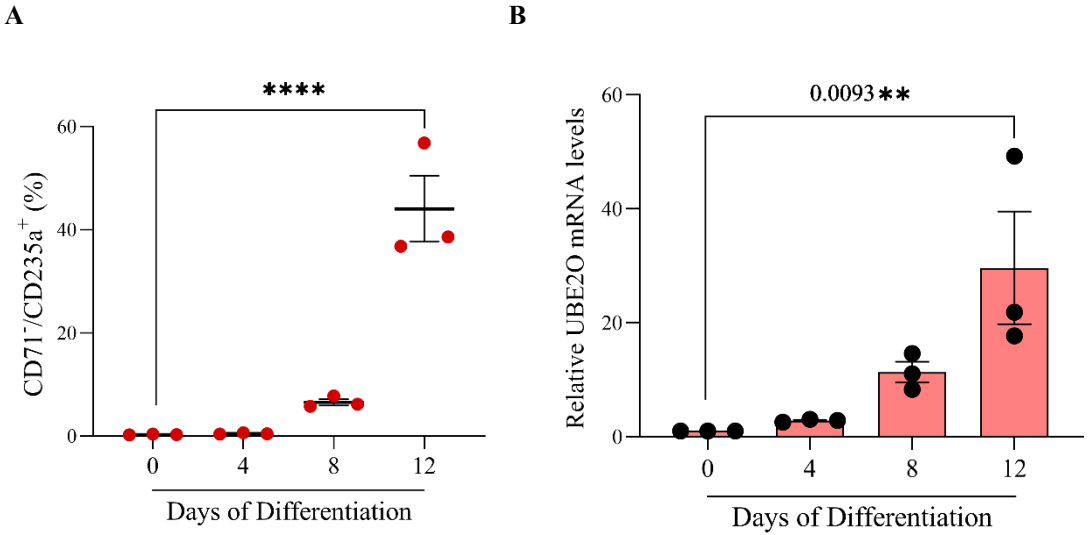
LETTER ▸ Haematologica. 2020 Aug;105(8):e389–e394. doi: 10.3324/haematol.2019.229211

Comparing the two leading erythroid lines BEL-A and HUDEP-2

Deborah E Daniels [1,2], Damien J Downes [3], Ivan Ferrer-Vicens [1], Daniel C J Ferguson [1], Belinda K Singleton [2,4], Marieangela C Wilson [1], Kongtana Trakarnsanga [5], Ryo Kurita [6], Yukio Nakamura [7], David J Anstee [2,4], Jan Frayne [1,2]

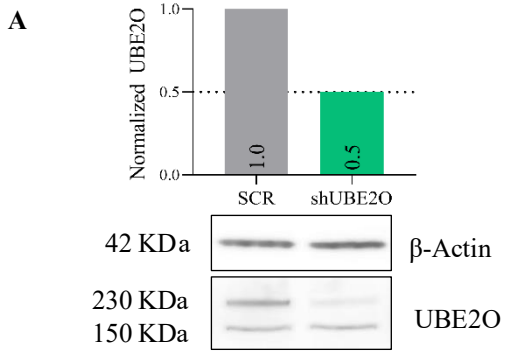


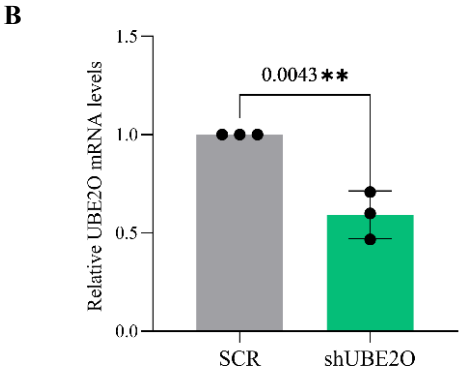
Daniels, Deborah E et al. "Comparing the two leading erythroid lines BEL-A and HUDEP-2." Haematologica vol. 105,8 (2020): e389-e394. doi:10.3324/haematol.2019.229211

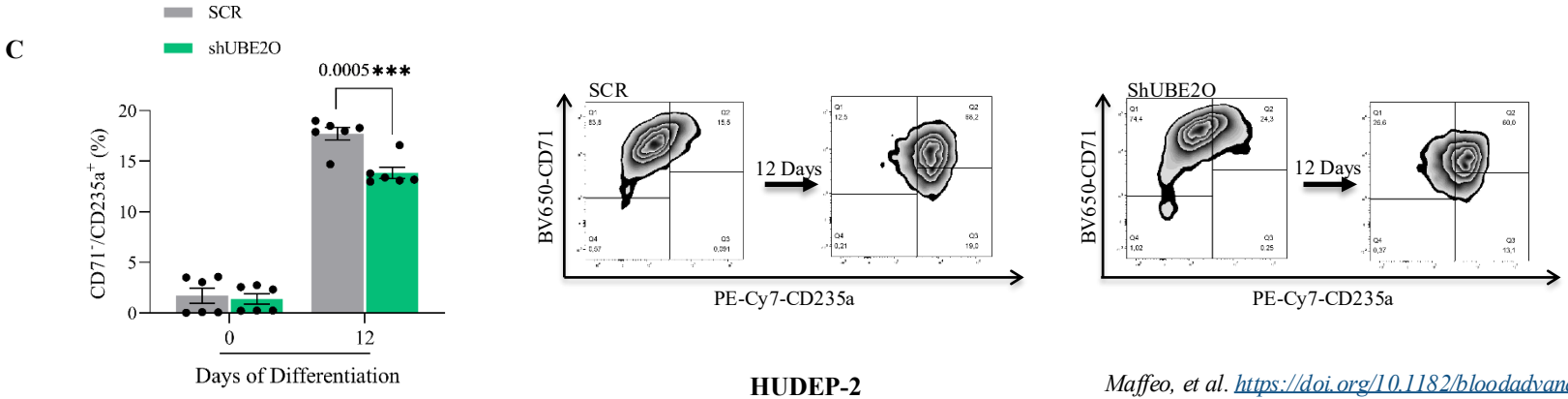


Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

UBE2O silencing reduces erythroid differentiation of HUDEP-2 cells





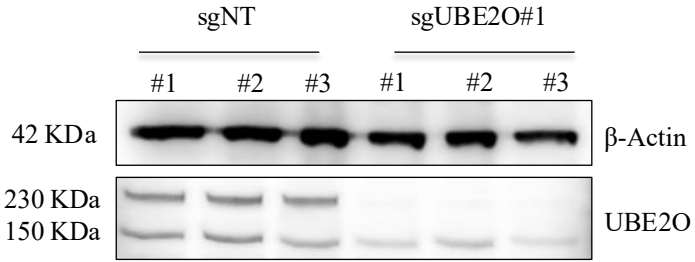


HUDEP-2

Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

Functional validation of UBE2O loss in primary CD34⁺ hematopoietic cells

A



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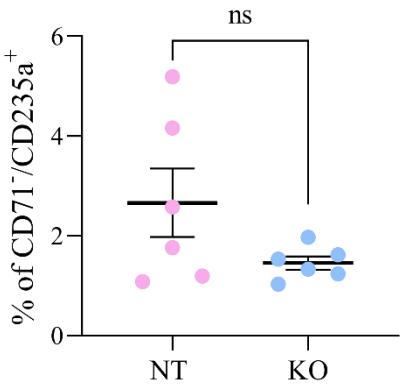
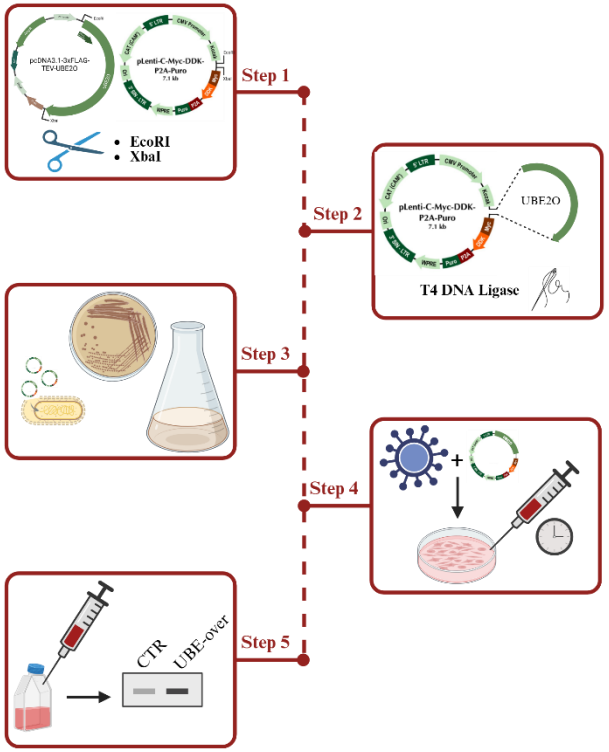
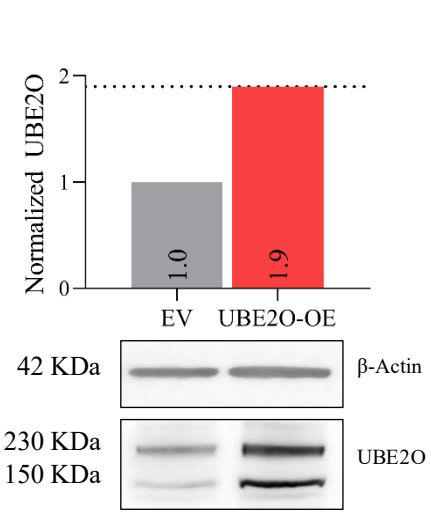
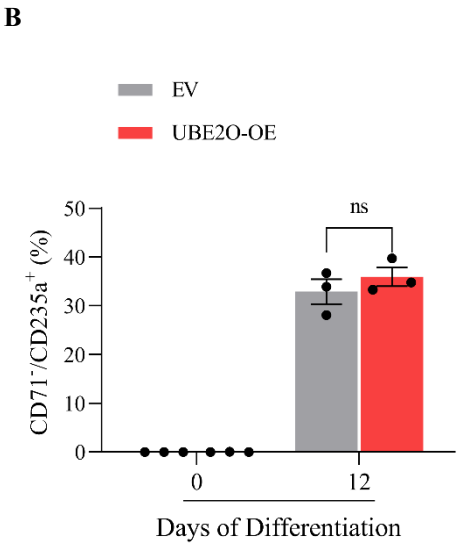


HD CD34⁺

Overexpression of UBE2O in HUDEP-2 cells is not sufficient to enhance terminal erythroid maturation







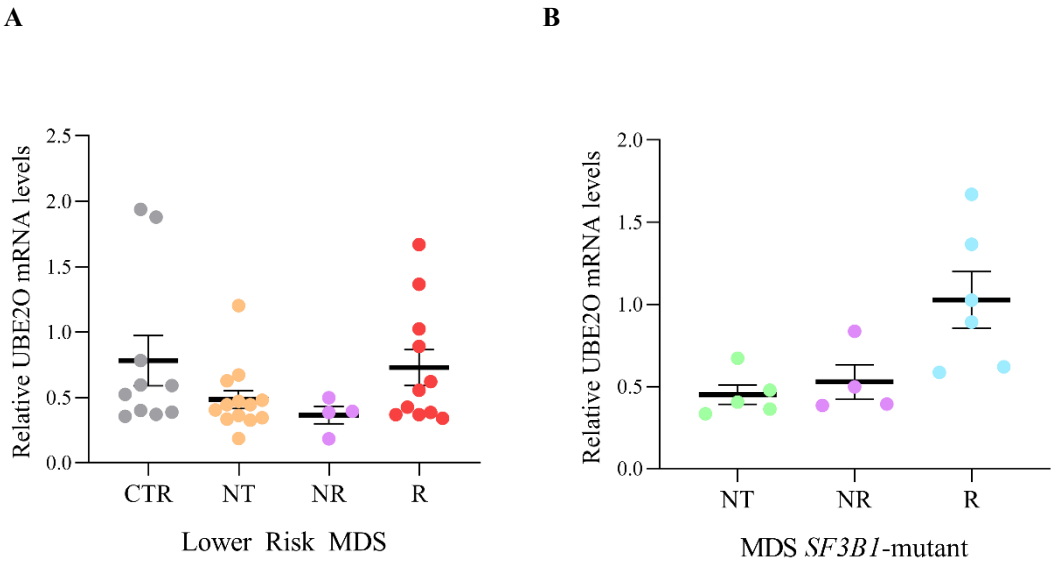
HUDEP-2

Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

Erythroid stimulation upregulates UBE2O expression in MDS patients' samples

MDS

- MDS is a malignant myeloid clonal disorder
- Bone marrow dysplasia, genetic abnormalities and ineffective erythropoiesis
- Lower risk MDS are clinically treated with erythtropoiesis inducing agents to correct anemia

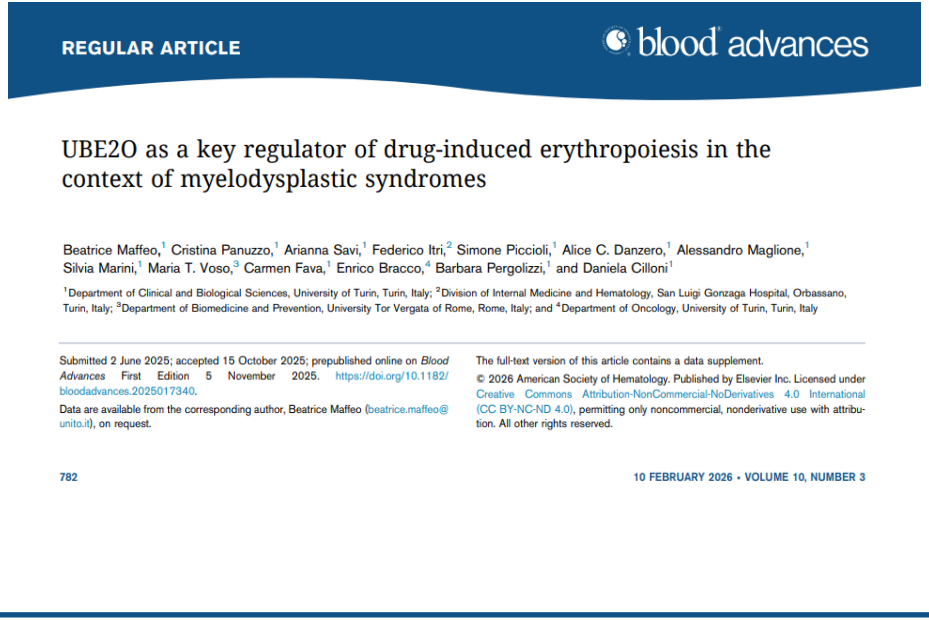


PBMCs

Maffeo, et al. https://doi.org/10.1182/bloodadvances.2025017340

Conclusion

- UBE2O is a key regulator of erythroid maturation
- UBE2O deficiency affects erythroid differentiation capacity
- GATA1 directly regulates UBE2O transcription
- Erythropoietin and luspatercept converge on the GATA1/UBE2O axis
- UBE2O could represent a biomarker of treatment response in MDS



REGULAR ARTICLE

blood advances

UBE2O as a key regulator of drug-induced erythropoiesis in the context of myelodysplastic syndromes

Beatrice Maffeo,[1] Cristina Panuzzo,[1] Arianna Savi,[1] Federico Itri,[2] Simone Piccioli,[1] Alice C. Danzero,[1] Alessandro Maglione,[1] Silvia Marini,[1] Maria T. Voso,[3] Carmen Fava,[1] Enrico Bracco,[4] Barbara Pergolizzi,[1] and Daniela Cilloni[1]

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Data are available from the corresponding author, Beatrice Maffeo (beatrice.maffeo@unito.it), on request.

The full-text version of this article contains a data supplement.

Lab. Cilloni

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