



UNIVERSITY OF PÉCS
MEDICAL SCHOOL

The role of artificial and natural origin food dye in altering gene expression patterns of DNMTs and HDACs in vitro.

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What is food coloring?

Is any dye, pigment, or substance that imparts color when it is added to food or drink.

Make food more attractive and appealing.

Correct and/ or enhance the natural color of the food.

Provide information regarding the food for example green is associated with mint flavor.

- MAGYAR TÁPLÁLKOZÁSTUDOMÁNYI TÁRSASÁG XLV. VÁNDORGYŰLÉSÉNEK SZEGED, 2022. október 20-22.



Introduction



Tartrazine (E102, CI Food Yellow 4)



- Synthetic lemon-yellow azo dye
- ADI of 0–10 mg/kg bw
- Causes hepato/nephrotoxicity and alters several metabolic parameters in experimental animals
- Oxidative stress
- May cause food intolerance and ADHD-like behavior in children

Curcumin (E100)



- Bright yellow chemical produced by plants of the *Curcuma longa* species
- ADI of 0–3 mg/kg bw
- Natural anti-inflammatory
- Potent antioxidant
- Affect cancer growth and development

Objectives

1. How Tartrazine and Curcumin at different concentrations can affect the gene expression of DNMTs and HDACs mRNA in various cell line.
2. After UV exposure, what happens to the expression level of DNMTs and HDACs when treated with Tartrazine and Curcumin.

Materials and methods

- Hep G2
- A549
- HaCat



Treatment plan	
-	20 mM
UV: 15 s	
UV: 30 s	
UV: 60 s	
-	40 mM
UV: 15 s	
UV: 30 s	
UV: 60 s	
-	80 mM
UV: 15 s	
UV: 30 s	
UV: 60 s	

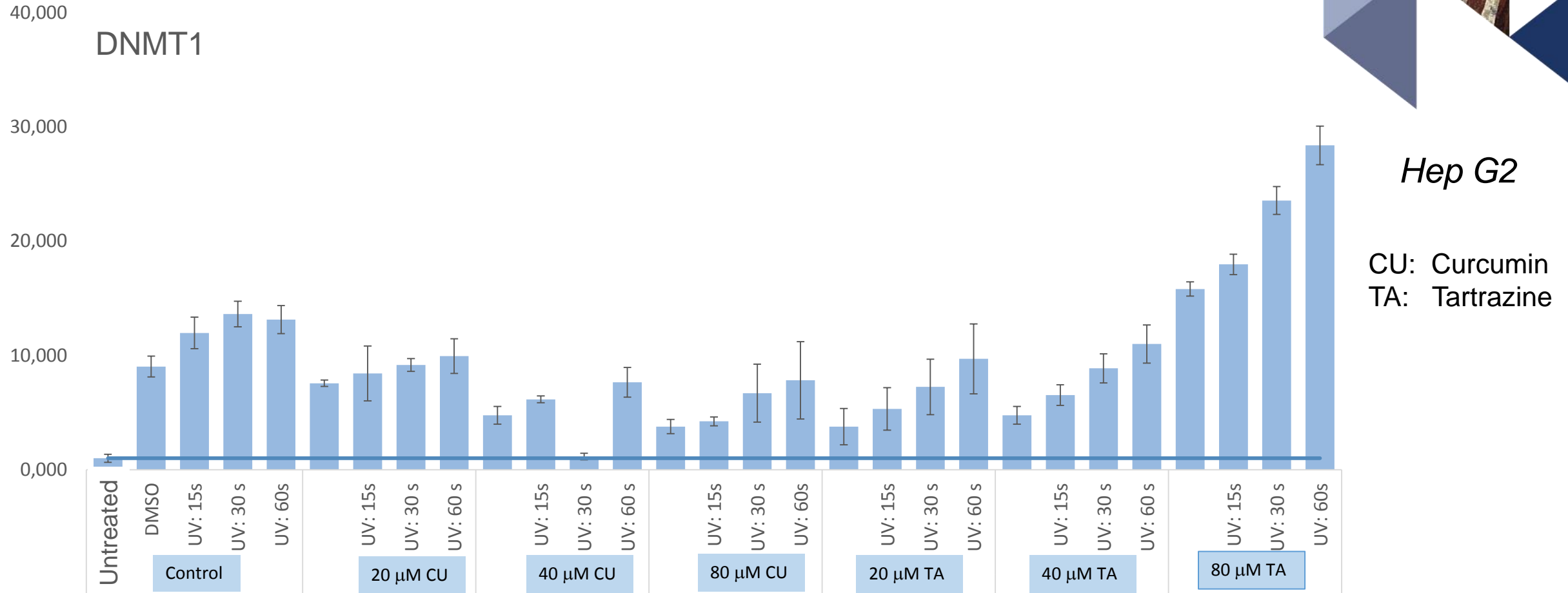
Materials and methods

- 24 hours at 37 °C with 5% Co₂ incubation.
- RNA isolation, ExtraZol Tri-reagent protocol.
- RT-PCR SYBR Green protocol.
- Statistical analysis.

	<u>forward</u>	<u>reverse</u>
DNMT1	5'- GGA GCA GGT GGA GAG TTA -3'	5'- GTA GAA TGC CTG ATG GTC TG -3'
DNMT3a	5'- GCA GCG TCA CAC AGA AG -3'	5'- GGC GGT AGA ACT CAA AGA AG -3'
DNMT3b	5'- GAA CGA CGT GAG GAA CAT C -3'	5'- GGC CTG TAC CCT CAT ACA -3';
HDAC5	5'- CAG CAC CAT CGG TTC ATA G -3'	5'- CAG GGA GAG AGT GGG TAA G -3'
HDAC6	5'- GCC CAG GCT TCA GTT TC -3'	5'- CCT CGC TCT CCT CTA CAT T -3'
HPRT1	5'- TGC TTC TCC TCA GCT TCA -	5'- CTC AGG <u>AGG AGG</u> AAG CC -3

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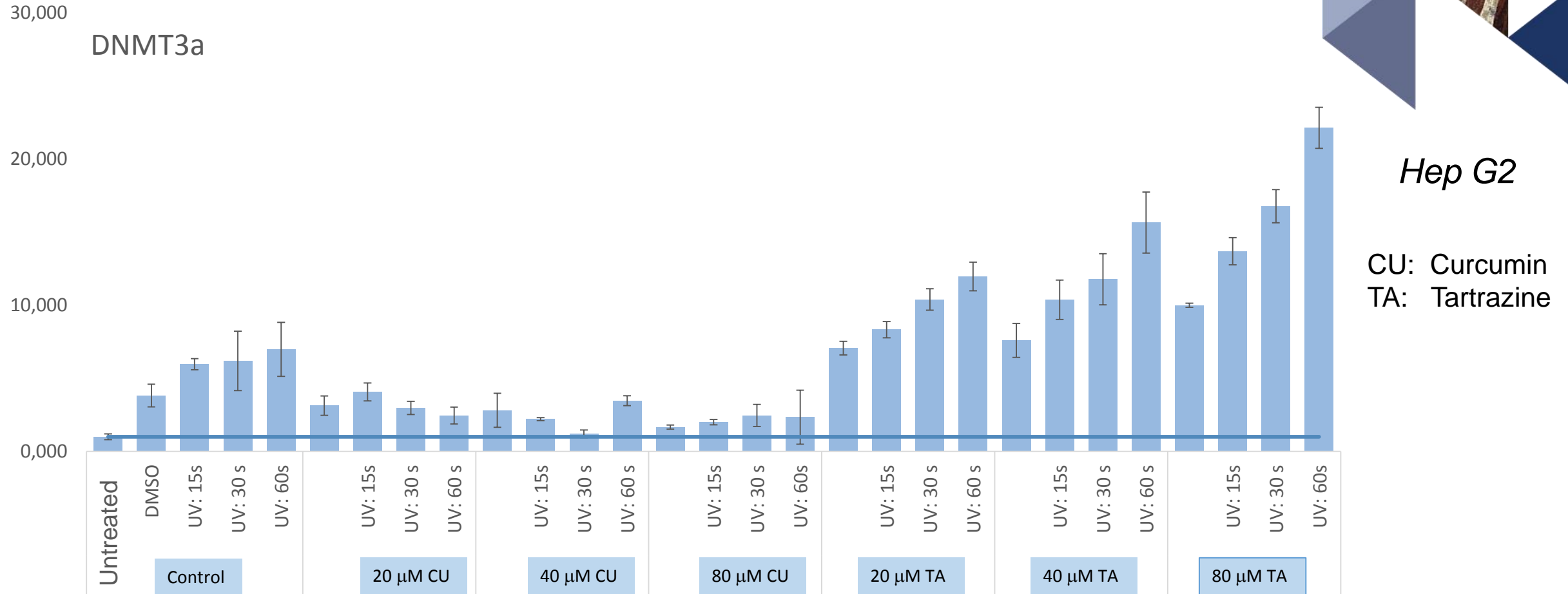
Results



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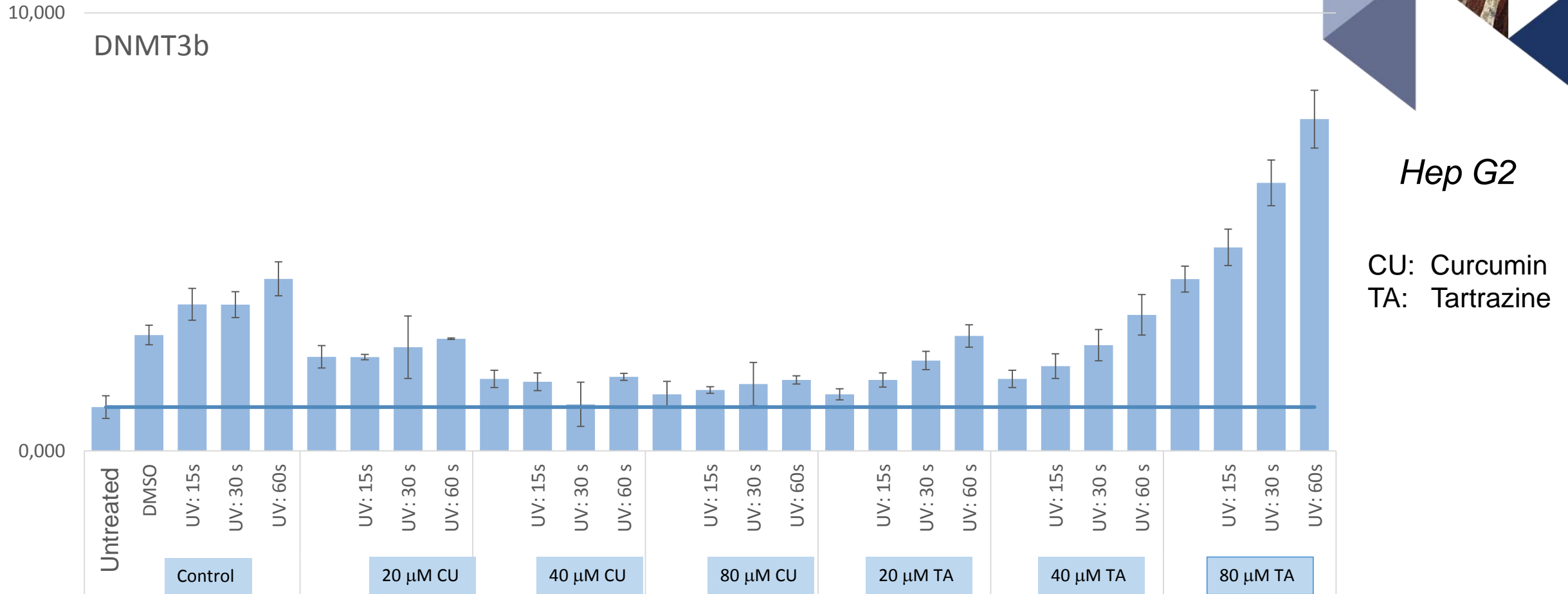
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Results



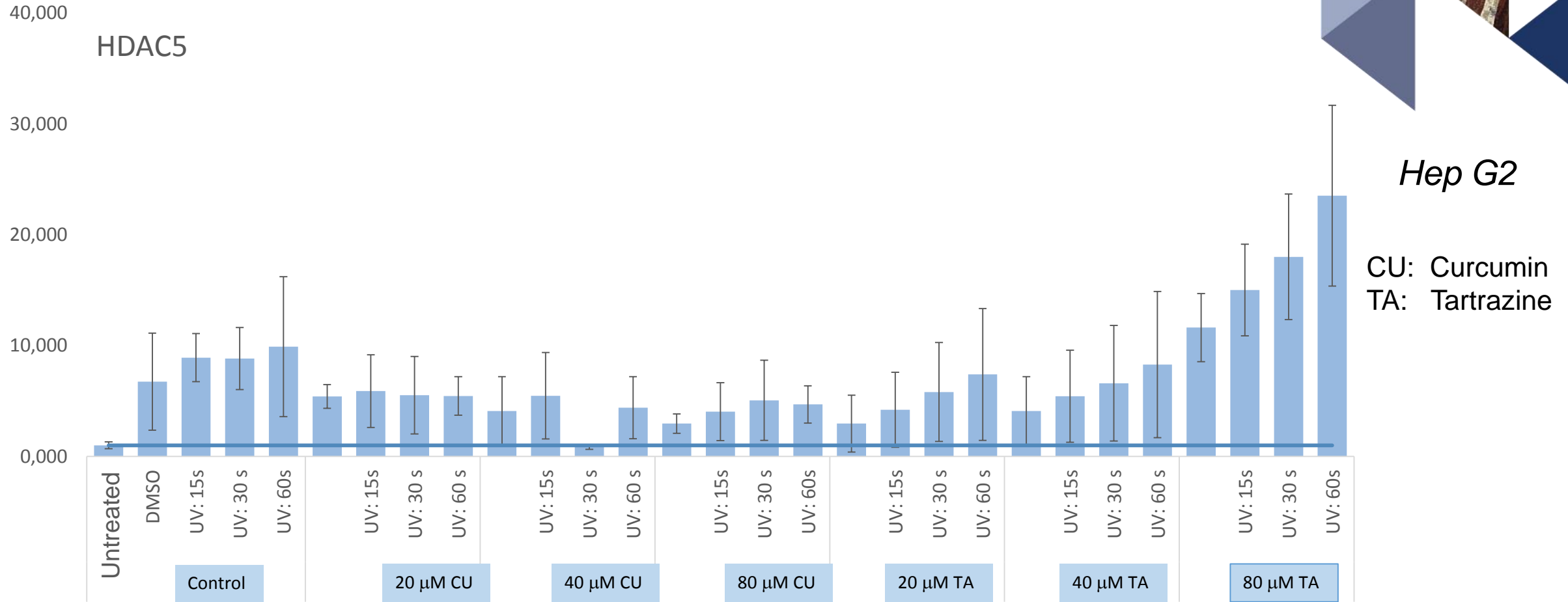
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Results



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Discussion and conclusion

- DNMTs and HDACs over expression have shown to increase risk of cancer and metastasis.
- Although Tartrazine is still used extensively in USA, it increased mRNA levels at all concentrations, cumulatively with UV radiation.
- Curcumin, like other chemo preventive agents, significantly reduced the gene expression-enhancing effect of UV radiation.

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Thank you for your attention