

IHC25-PO-225: Characterisation of cadmium exposure and epigenetic changes in cluster headache



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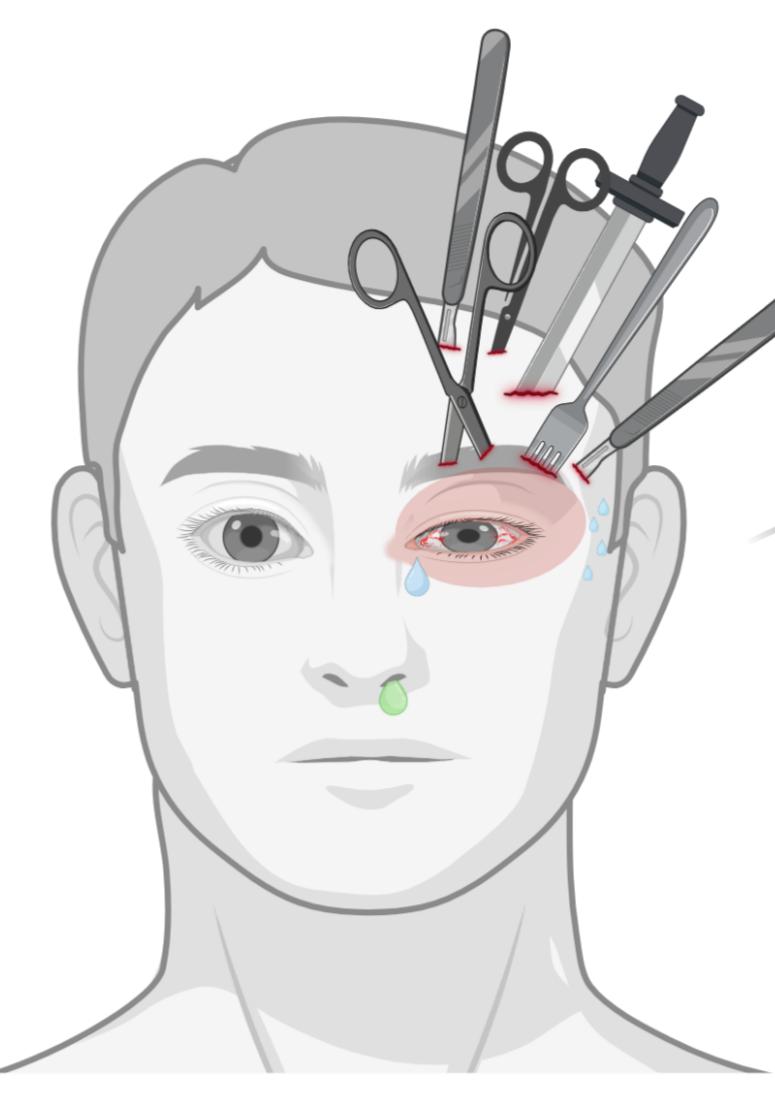
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Conclusions:

- Increased expression of CHRNA6 and CHRNA7 could suggest an **increase in nicotinic acetylcholine receptors**
- Increased expression of MT1H and MT3 could suggest an **increase in heavy metal exposure**
- Decreased DNMT1 expression and methylation of LINE-1 could suggest **altered global methylation**
- No evidence of liver and kidney damage** in cluster headache

Background:

Cluster headache



Higher tobacco usage

→

Heavy metal exposure

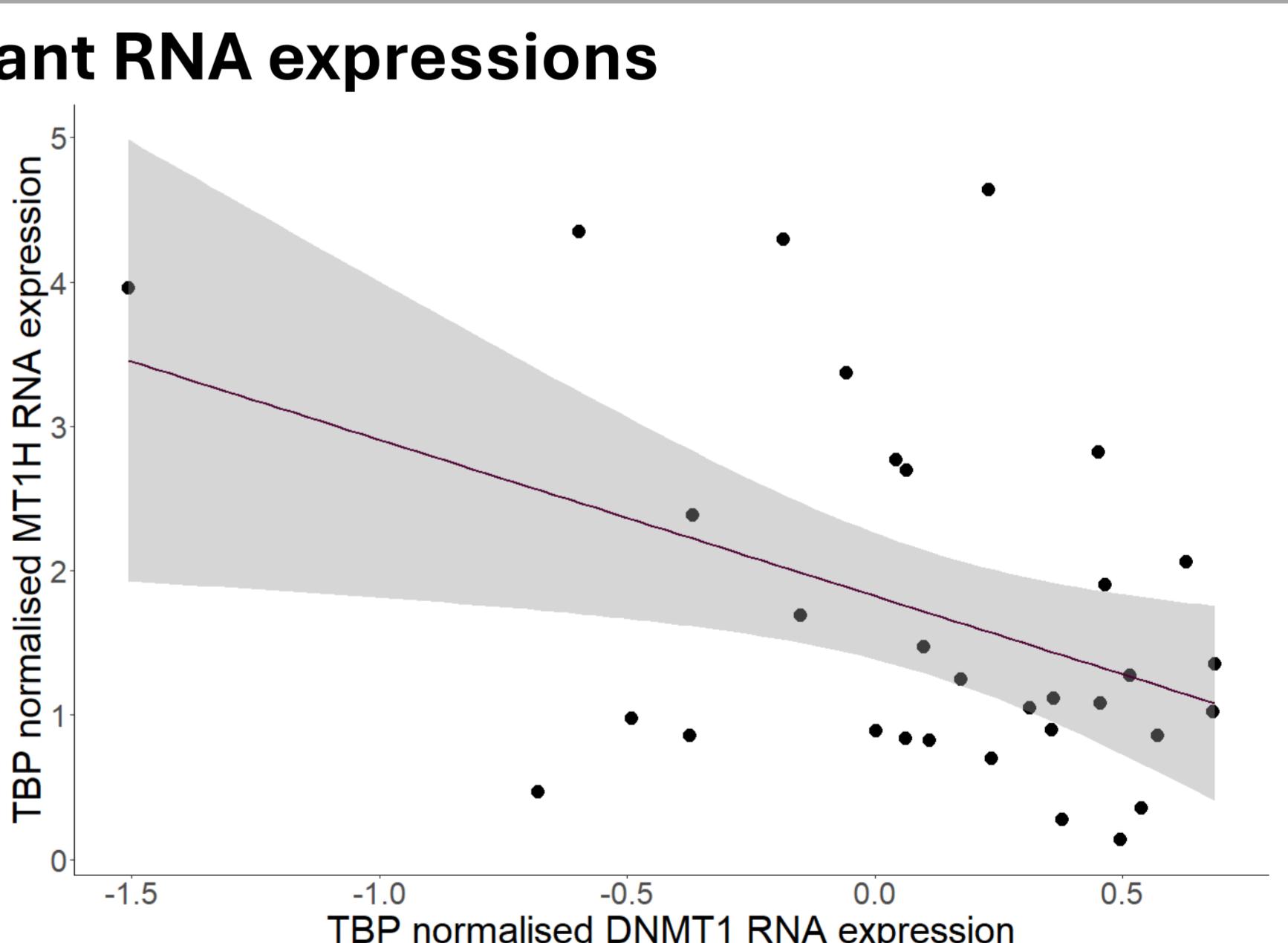
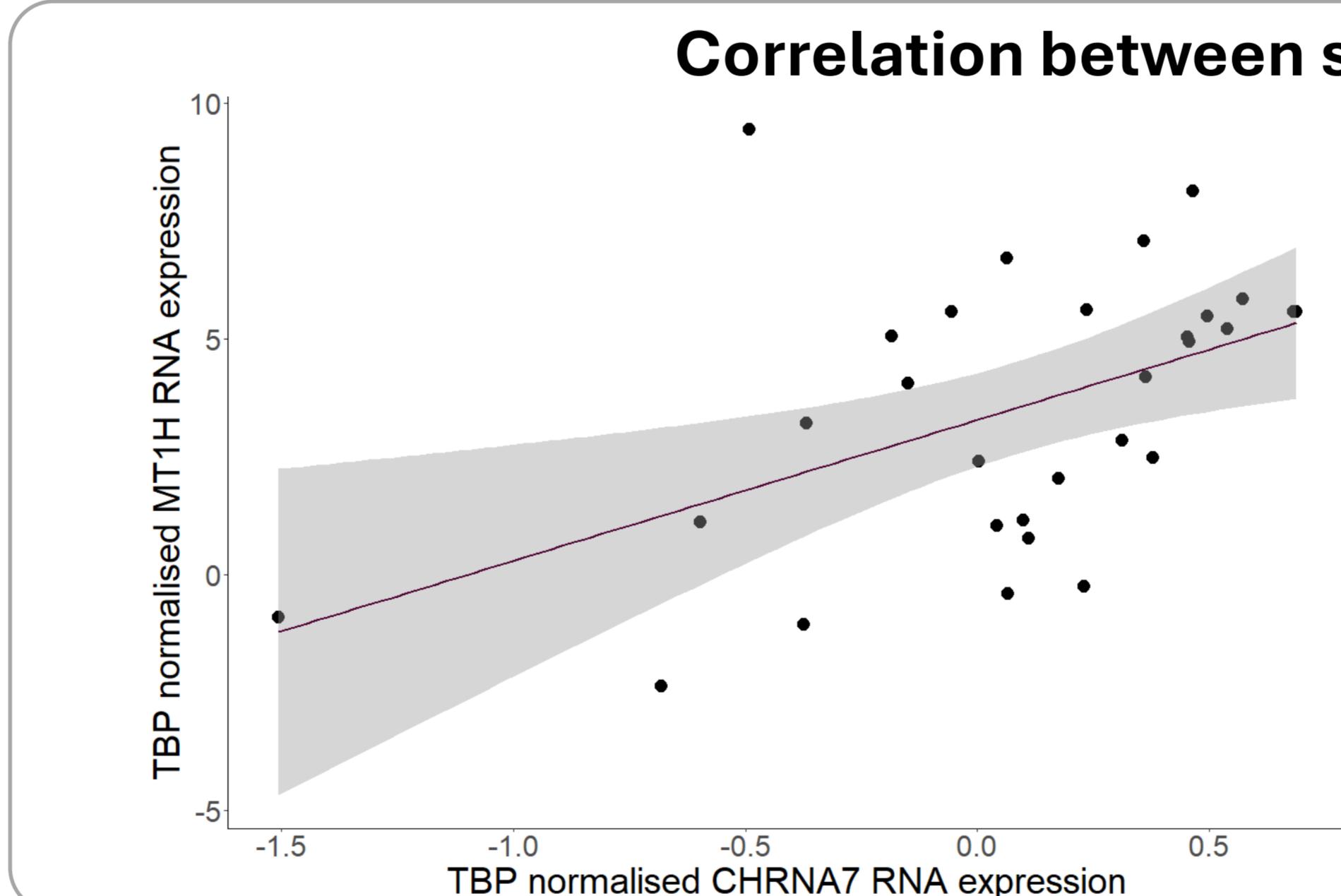
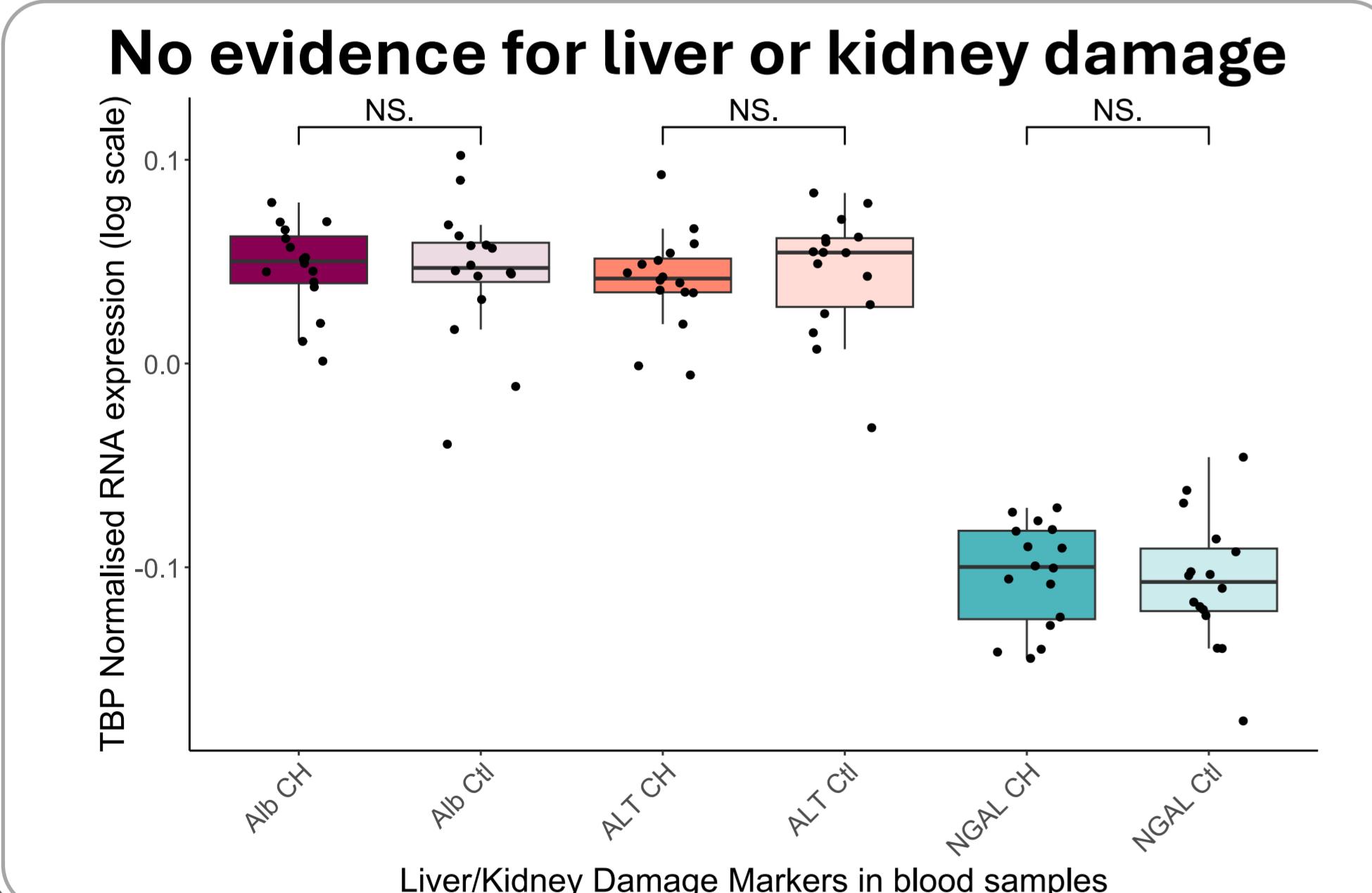
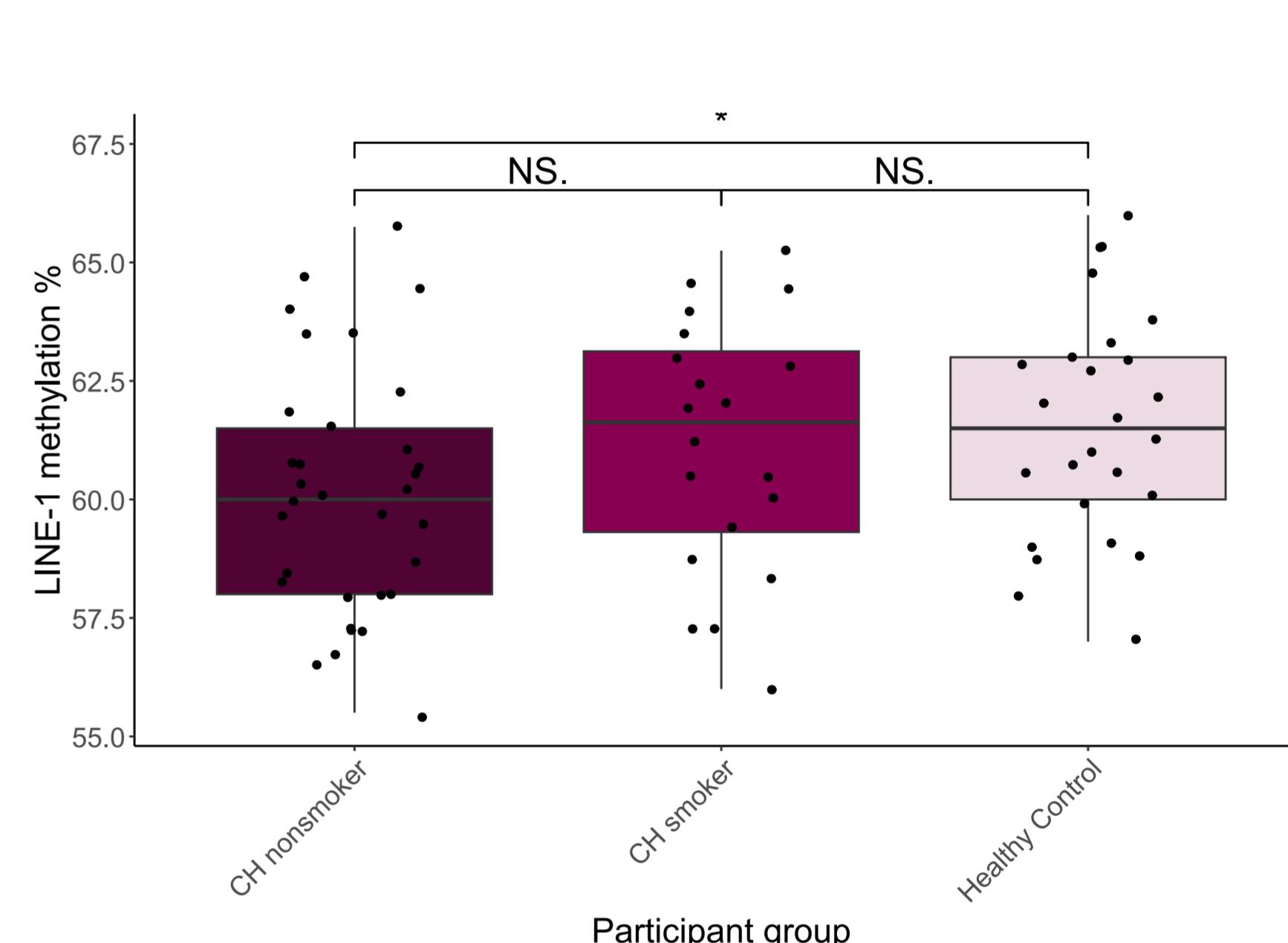
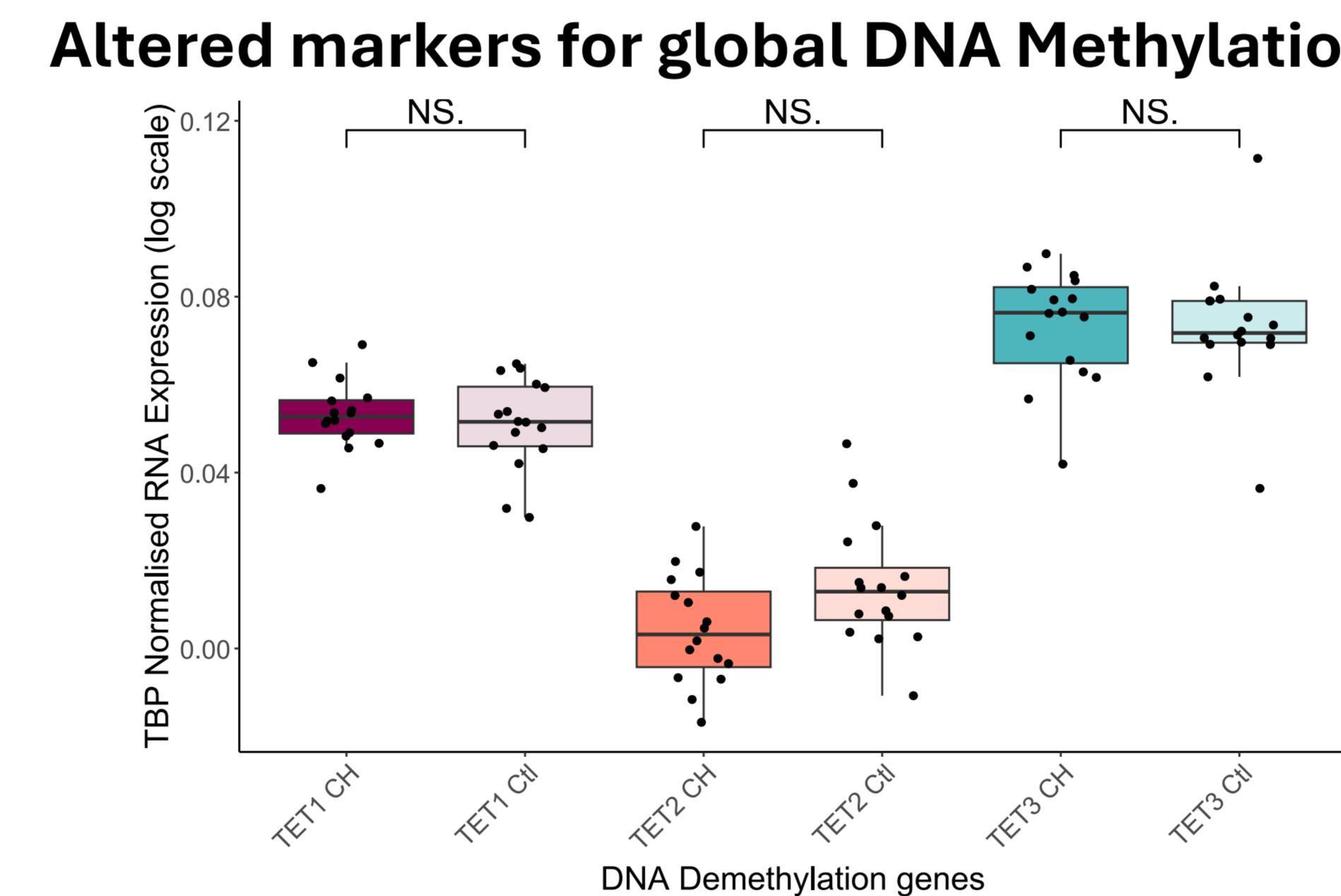
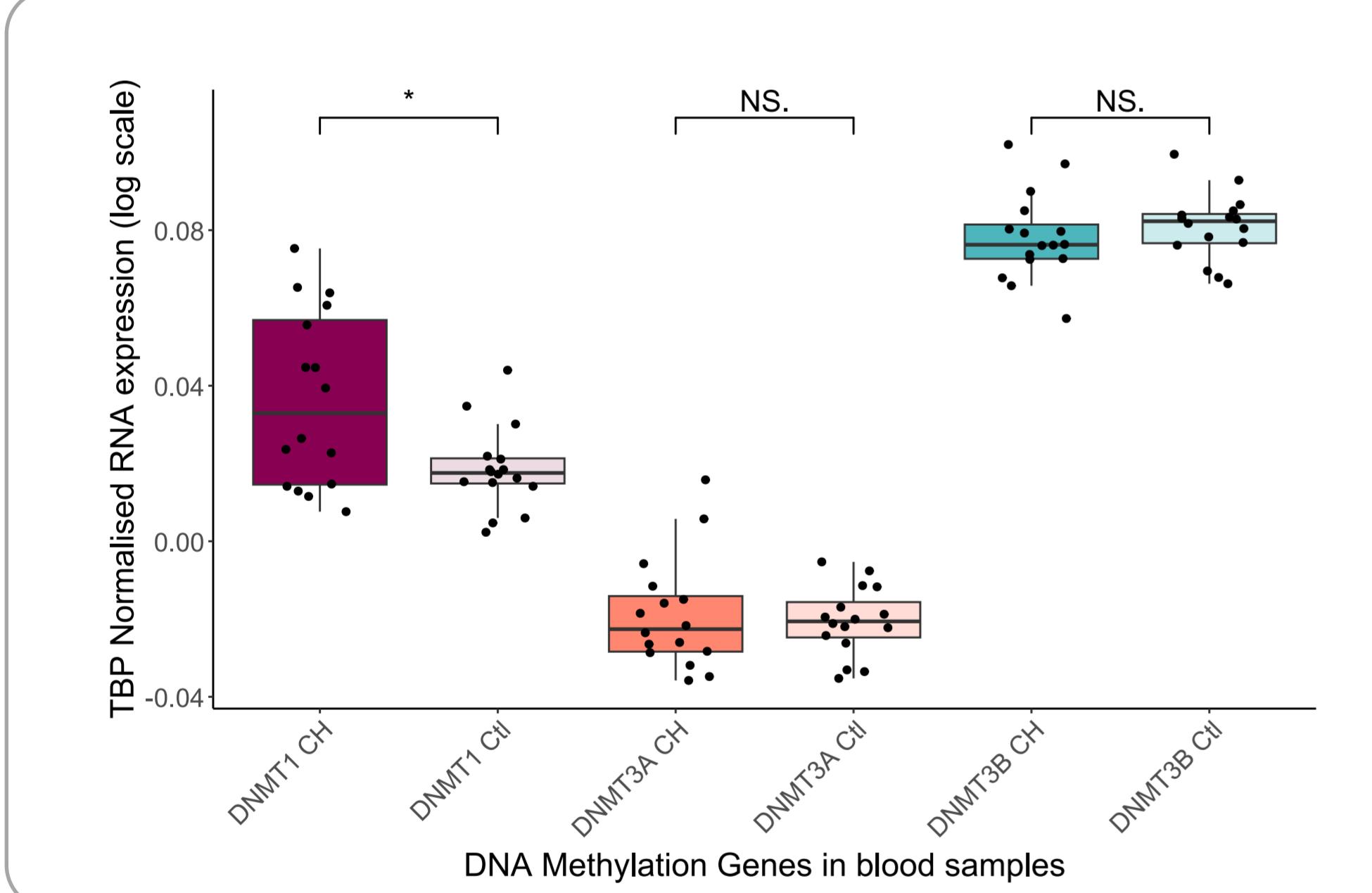
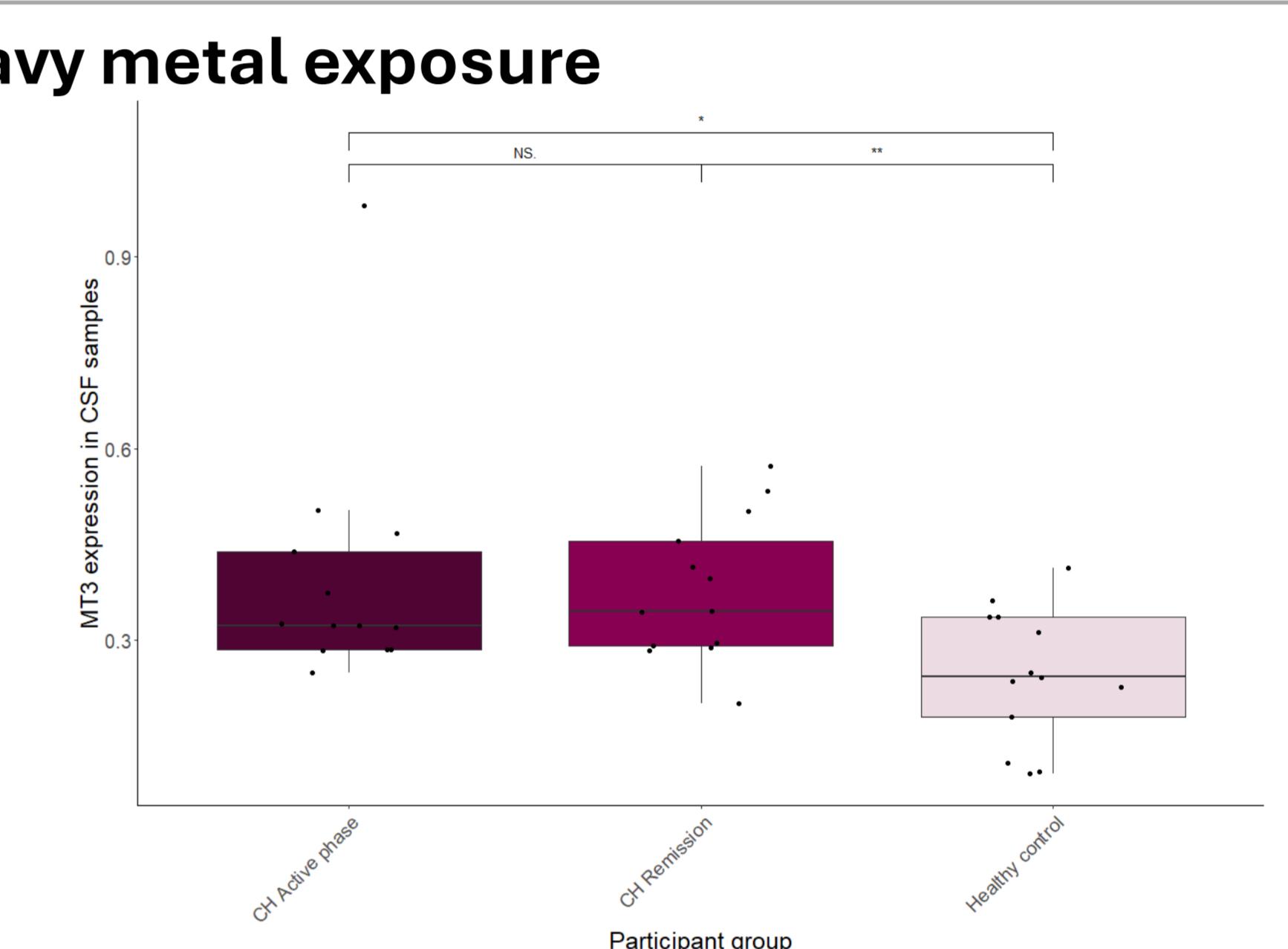
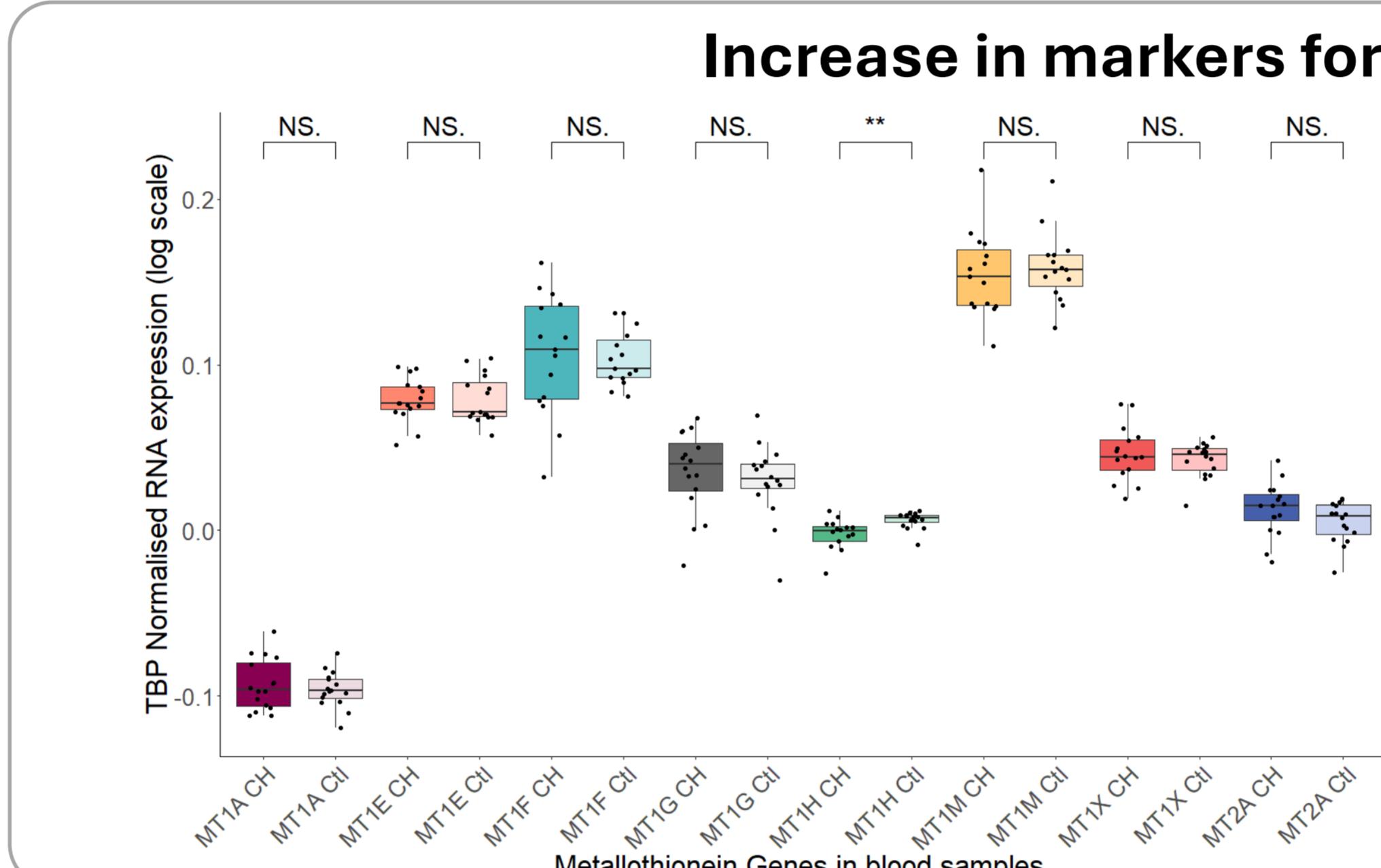
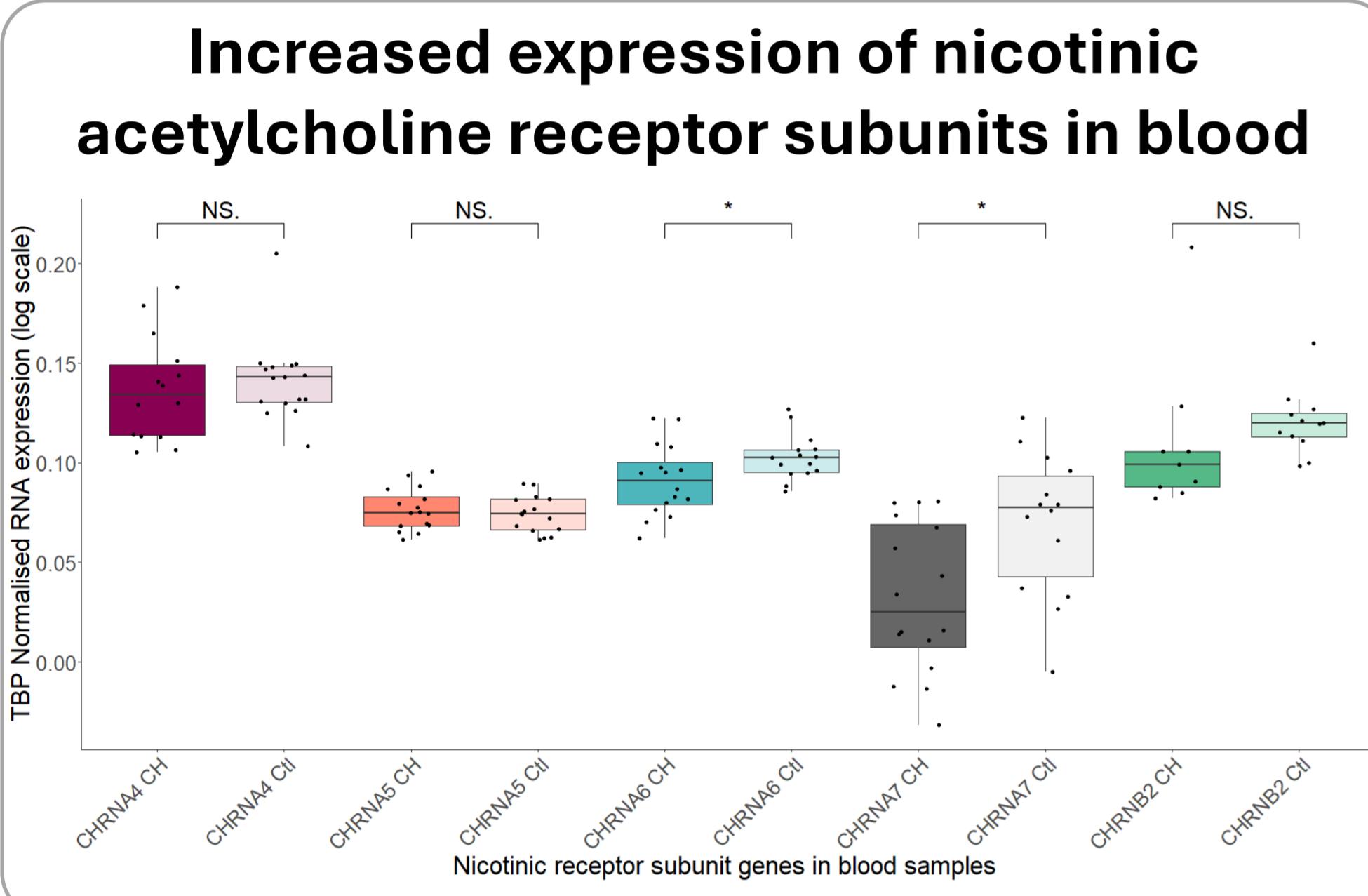
48	112.414	Cd	Cadmium	[Kr] 4d ¹⁰ 5s ¹	Transition Metal
33	74.922	As	Arsenic	[Ar] 3d ¹⁰ 4s ²	Metalloid
82	207.2	Pb	Lead	[Xe] 4d ¹⁰ 5s ² 5p ²	Post-Transition Metal

28	58.69	Ni	Nickel	[Ar] 3d ¹⁰ 4s ²	Transition Metal
24	51.096	Cr	Chromium	[Ar] 3d ⁵ 4s ¹	Transition Metal

Heavy metals cause DNA Methylation

Aim: To elucidate if tobacco use exposes individuals with cluster headache to heavy metals which contribute to epigenetic modifications

Results:

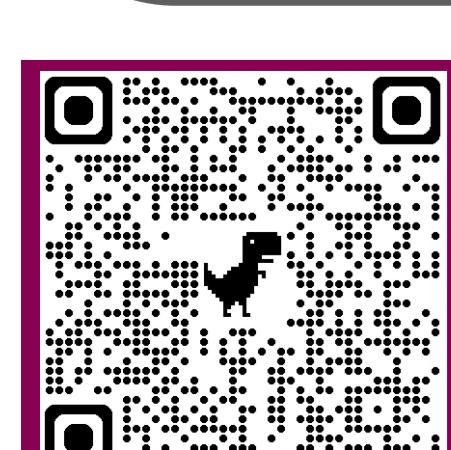


Methods:

- RTqPCR used to quantify RNA expression of: housekeeping gene (TBP), nicotinic acetylcholine receptor subunits (CHRNA4, CHRNA5, CHRNA6, CHRNA7, CHRN B2) heavy metal exposure genes (MT1A, MT1E, MT1F, MT1G, MT1H, MT1M, MT1X, MT2A), DNA methylation (DNMT1, DNMT3a, DNMT3b), DNA demethylation (TET1, TET2, TET3) and markers of liver/kidney damage (Alb, ALT, NGAL) in blood collected in PAX tubes
- Human MT3 (metallothionein 3) ELISA kit to quantify MT3 protein in Cerebrospinal fluid samples
- Pyromark Q96 CpG LINE-1 kit used to evaluate methylation of 4x CpG sites in Long interspersed nuclear element-1 (LINE-1) gene in bisulfite transformed DNA

Demographics

Group	Tissue sample	N	Sex		Average age (years)	Smoker		
			Male	Female		now	prev.	never
Cluster Headache (CH)	Blood	16	14	2	45.3	2	9	5
	CSF	13	11	2	47.0	9	2	0
Healthy control (Ctl)	Blood	16	9	6	35.5	0	2	13
	CSF	13	-	-	-	-	-	-



Centre for Cluster Headache

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