



Decreased circulating levels of MOTS-c in individuals with newly diagnosed type 1 diabetes

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Background and Aims

- A novel bioactive peptide, mitochondrial-derived peptide (MOTS-c), has recently attracted interests as a potential prevention or therapeutic option for obesity and type 2 diabetes mellitus in mice.
- MOTS-c profiles have not yet been reported in type 1 diabetes (T1DM).
- We aimed to determine circulating MOTS-c levels in T1DM and explore the association between MOTS-c levels and various metabolic parameters.

Methods

- In this case-control study, 60 age-, sex- matched children were recruited in the Hubei Province of China in 2015-2017. Thirty (16 females and 14 males) of these individuals were newly diagnosed T1DM children and 30 (15 females and 15 males) were of normal glucose.
- Subjects were excluded if they used medications such as insulin or metformin.
- MOTS-c levels in the fasting plasma were assessed using a commercially available enzyme-linked immunosorbent assay (ELISA), clinical data (e.g., serum glucose, insulin, C-peptide, HbA1c, and lipid profile) were recorded, and anthropometric measurements were performed.
- Finally, we investigated correlations between MOTS-c levels and related variables.

Results

- Circulating MOTS-c levels were significantly decreased in newly diagnosed T1DM children compared with those in the normal control group (445.45 ± 21.29 ng/mL vs. 565.41 ± 20.19 ng/mL, $p < 0.001$).
- In addition, when stratified by sex, the trend of plasma MOTS-c reduction was similar in female and male patients with newly diagnosed T1DM (female 438.44 ± 33.06 ng/mL vs. 557.85 ± 27.85 ng/mL, $p < 0.05$; male 453.47 ± 26.75 ng/mL vs. 572.98 ± 30.08 ng/mL, $p < 0.05$, respectively).
- Finally, we observed that MOTS-c levels were negatively correlated with random blood glucose ($r = -0.380$, $p = 0.003$), HbA1c ($r = -0.408$, $p = 0.001$), and triacylglycerol ($r = -0.283$, $p = 0.029$), and positively correlated with HDL-cholesterol ($r = 0.294$, $p = 0.023$) and C-peptide ($r = 0.338$, $p = 0.015$).

Conclusions

- Circulating MOTS-c levels were decreased in newly diagnosed T1DM children.
- Although the role of MOTS-c as a treatment for T1DM will require further investigation, it is possible that a decline in MOTS-c might be a biomarker of T1DM children.

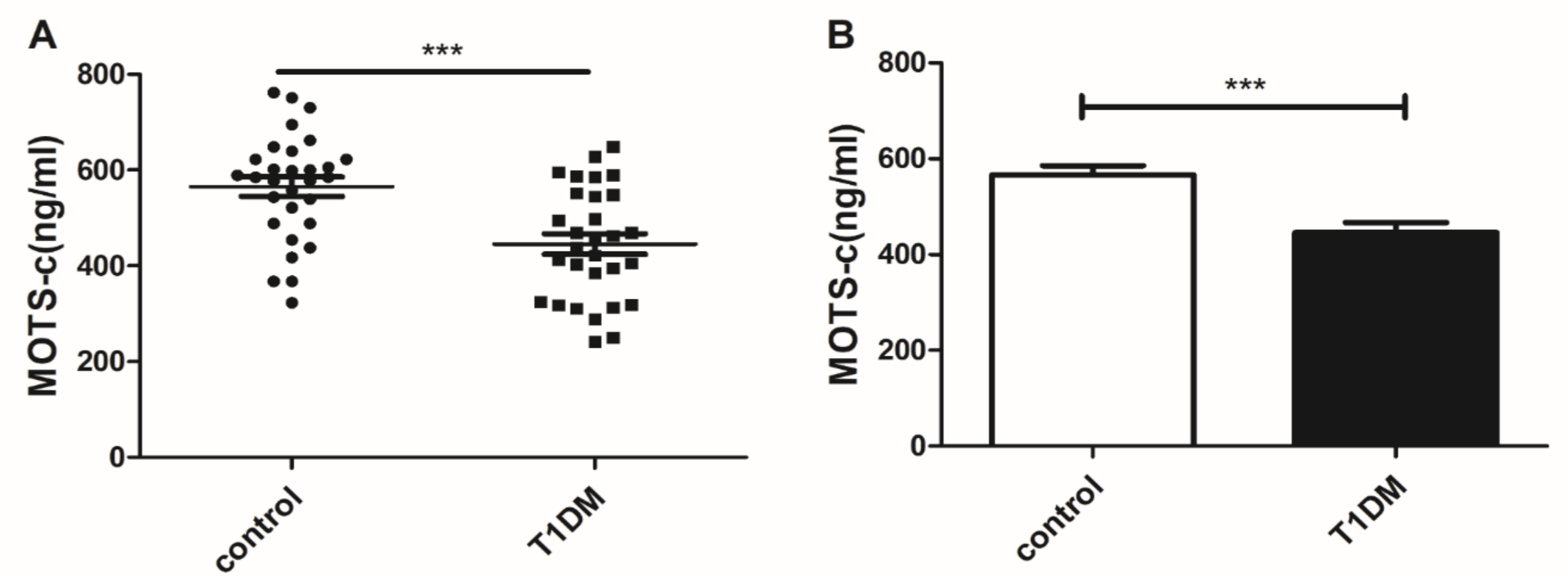


Fig. 1. Decreased circulating MOTS-c levels in patients with newly diagnosed type 1 diabetes (A, B). Plasma concentrations of MOTS-c in the control group (n= 30) and T1DM group (n=30). Data are shown as mean \pm SEM. *** $p < 0.001$.

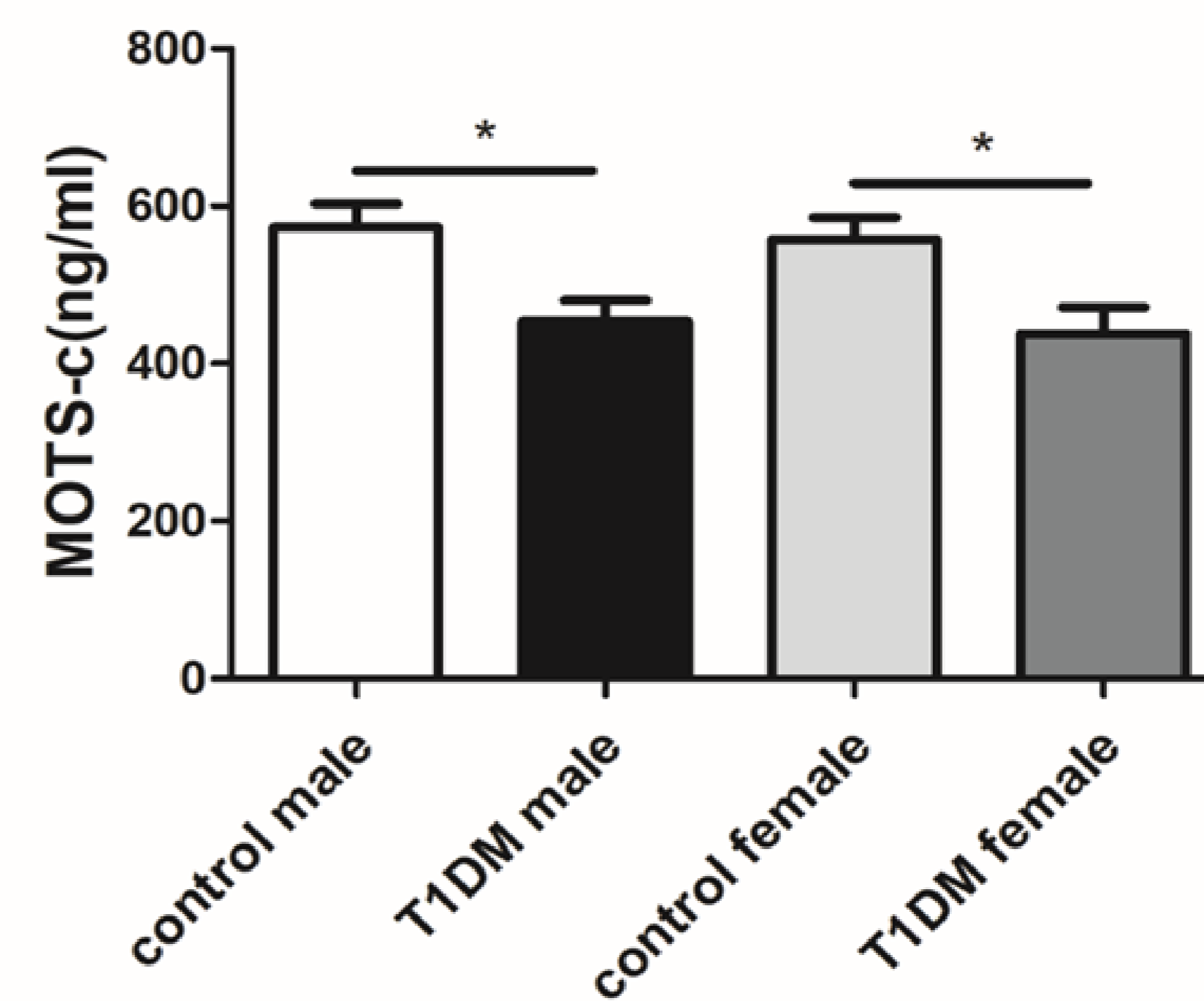


Fig. 2. Comparison of plasma MOTS-c levels according to different sexes: control male (n = 15), T1DM male (n = 14), control female (n = 15), and T1DM female (n = 16). Data are shown as mean \pm SEM. * $p < 0.05$.

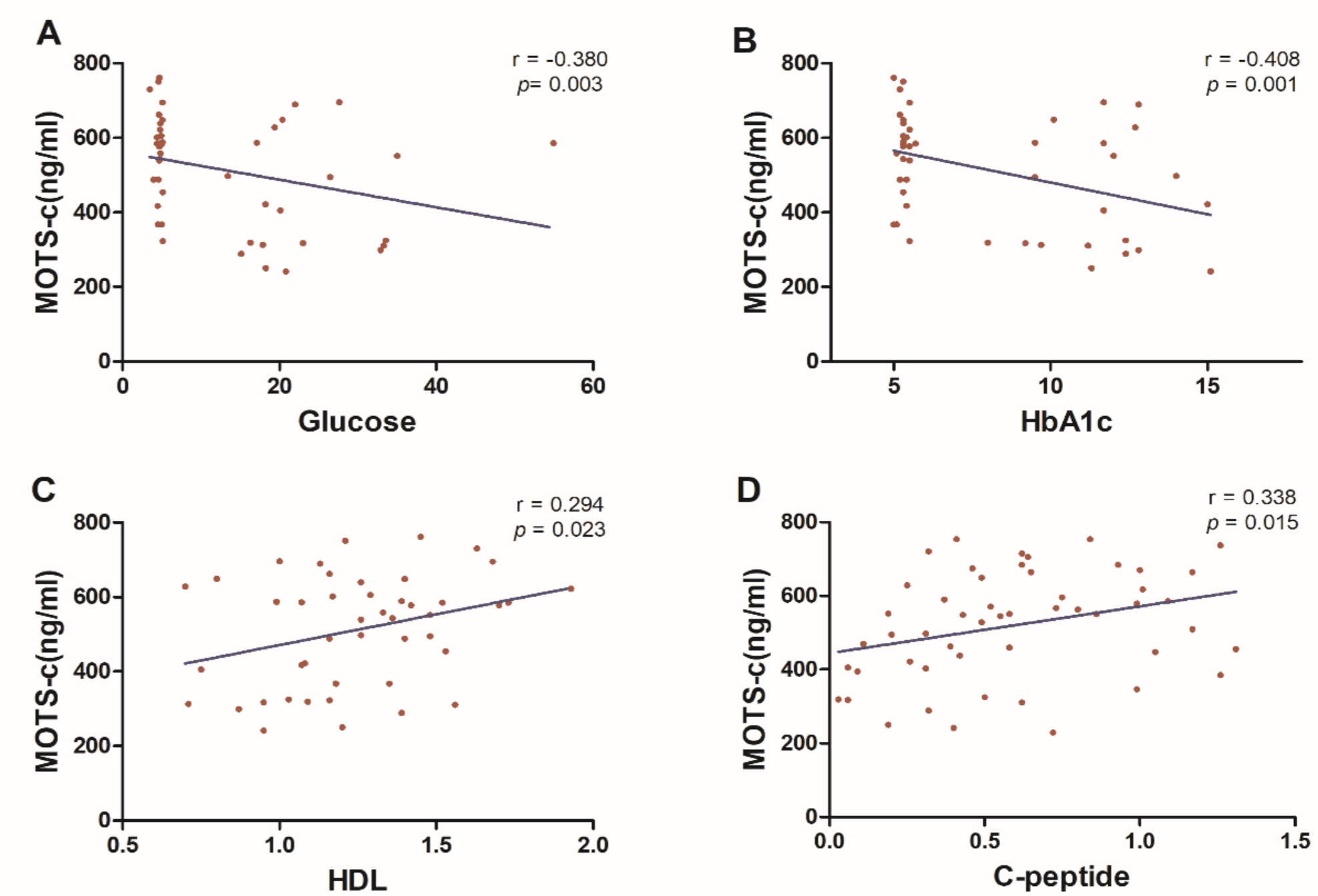


Fig. 3. MOTS-c concentrations were negatively correlated with Glucose and HbA1c (%), positively correlated with HDL-c, and C-peptide of healthy controls and newly diagnosed T1DM children. (A) Random blood glucose, $r = -0.380$, $p = 0.003$; (B) HbA1c (%), $r = -0.408$, $p = 0.001$; (C) HDL, $r = 0.294$, $p = 0.023$; (D) C-peptide, $r = 0.338$, $p = 0.015$.

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