Circulating blood serum MOTS-c levels higher in older females versus older males with no correlation to healthy HbA1c.

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BACKGROUND

- Mitochondria have strong implications in aging and age-related diseases.[1]
- Recently, a mitochondrial derived peptide named MOTS-c, was discovered to positively impact regulation of blood glucose in obese and insulin resistant mice.[3]
- MOTS-c levels are linked to regulation of obesity and diabetes related insulin resistance.
- Current data are lacking on the natural course of MOTS-c expression in aging humans.[2]

INTRODUCTION

- Aging is associated with insulin resistance and mitochondrial dysfunction.

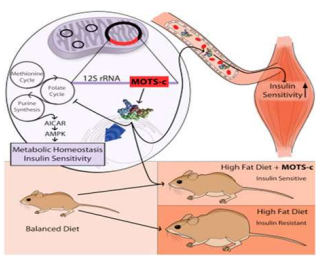


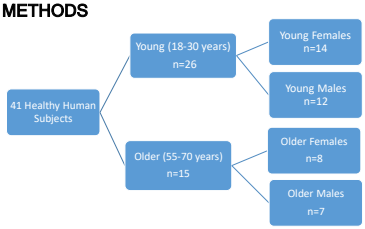
Figure 1. Schematic of the physiological impact of MOTS-c on mice. https://www.cell.com/article/s1550-4131(15)00061-3/abs.

- MOTS-c acts as a signaling hormone, targeting skeletal muscle and increasing blood glucose uptake through AMP-activated protein kinase.[1]
- Studies in mice with diet induced obesity injected with MOTS-c resulted in higher glucose metabolism and prevention of fat accumulation within the muscle.[2]

OBJECTIVE

- **This study aimed to compare if age and sex influence MOTS-c and Hemoglobin A1C levels in humans of various stages of life.**

METHODS



- Subjects refrained from:

Caffeine, alcohol, and food for 24, 8, and 4 hours, respectively prior to testing.

- Venous blood was collected for serum MOTS-c concentrations and HbA1c measurement.

Statistical Analysis

Independent student's t-tests were performed to determine **group mean differences** in serum MOTS-c concentrations between: Young and Older, Young Females and Young Males, and Older Females and Older Males. An α-level of ≤ 0.05 was set a priori. Statistical analyses were performed using SPSS (version 25).

RESULTS

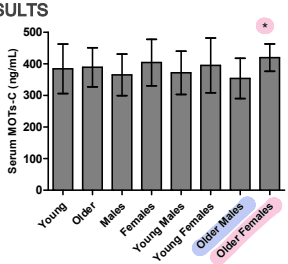


Figure 2. Serum MOTS-c concentrations (ng/mL) in Younger (n= 26), Older (n=15), Males (n=19), Females, (n=22), Young Males, (n=12), Young Females, (n=14), Older Males (n=7), and Older Females (n=8). *** signifies statistically different compared to older males (p=0.03)**

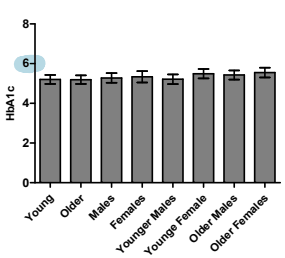


Figure 3. HbA1c levels (%) in Younger (n= 26), Older (n=15), Males (n=19), Females, (n=22), Young Males, (n=12), Young Females, (n=14), Older Males (n=7), and Older Females (n=8)

	Young (n=26)	Older (n=15)	Young Female (n=14)	Young Male (n=12)	Older Female (n=8)	Older Male (n=7)
Age (yrs)	22.6±3.3	60.5±4.2	21.1±1.6	24.3±3.9	60.6±3.9	60.4±4.8
MOTS-c (ng/mL)	384.4±78.3	389.2±61.9	395.2±86.8	371.7±68.7	420.0±43.3	354.0±63.7
HbA1c (%)	5.2±0.2	5.5±0.2	5.2±0.2	5.2±0.2	5.6±0.2	5.4±0.2

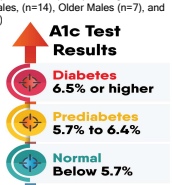


Figure 4. Chart of normal, prediabetic, and diabetic A1c levels. dyna-nutrition.com/the-importance-of-hba1c-test-for-diabetes/

- Serum MOTS-c concentrations were found to be significantly higher in older females compared to older males. (p=0.03)
- HbA1c levels in all subjects were considered in the normal, **healthy range (below 6%)** and did not show statistic significance with regards to aging or sex.

CONCLUSION

- No statistic significance was found between serum MOTS-c and Young and Older subjects, Males and Females, or Young Males and Young Females.
- Serum MOTS-c concentrations were higher in Older Females compared to Older Males. (p=0.03)
- No statistic significance was found between healthy HbA1c levels and subjects in all noted categories.
- These results suggests a relationship does exist between aging, sex, and MOTS-c, particularly in the older stages of life.

FUTURE WORK

1. Adult human subjects with pre-diabetic and diabetic HbA1c % ranges and its effects on MOTS-c serum.
2. Ethnic/demographic variability on HbA1c and MOTS-c concentrations.
3. Implications between the differences in metabolic aging on each sex should also be considered.
4. Dietary examination, specifically plant-based and its effects of MOTS-c.

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