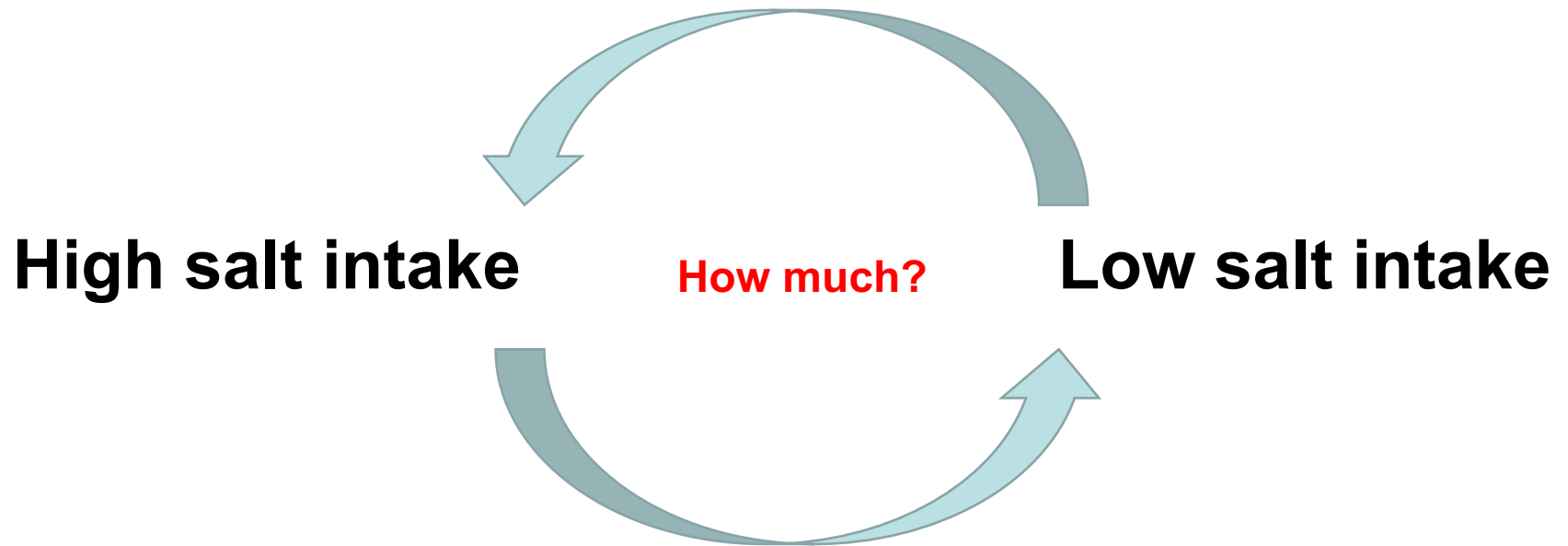




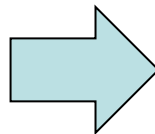
# **Effects of Mineral-rich Solar Sea Salt and Its Heat-treated Salt on Blood Pressure and Endothelial Dysfunction in Dahl Salt-Sensitive Rats**



**Salt debate**

## Another point of view

Various types of salts

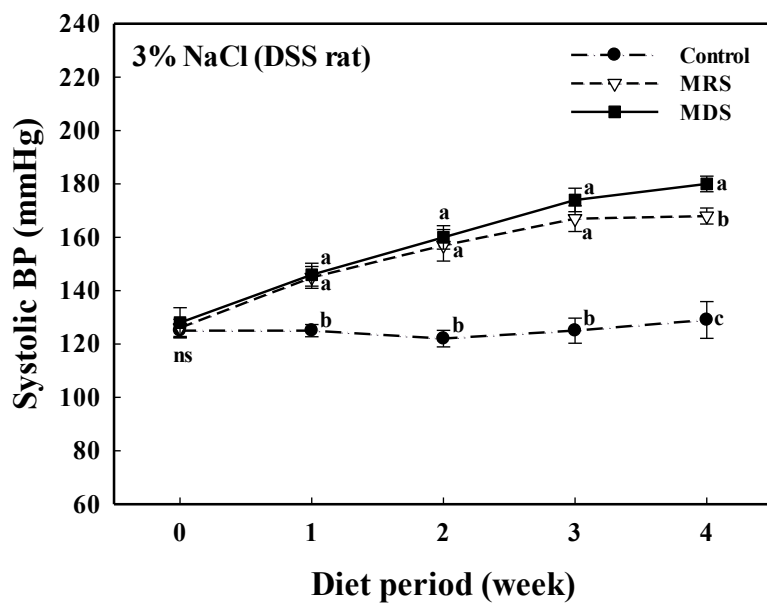


**Rock salt**  
**Solar sea salt**  
**Recrystallized Salt**  
**Purified salt**  
**Etc.**

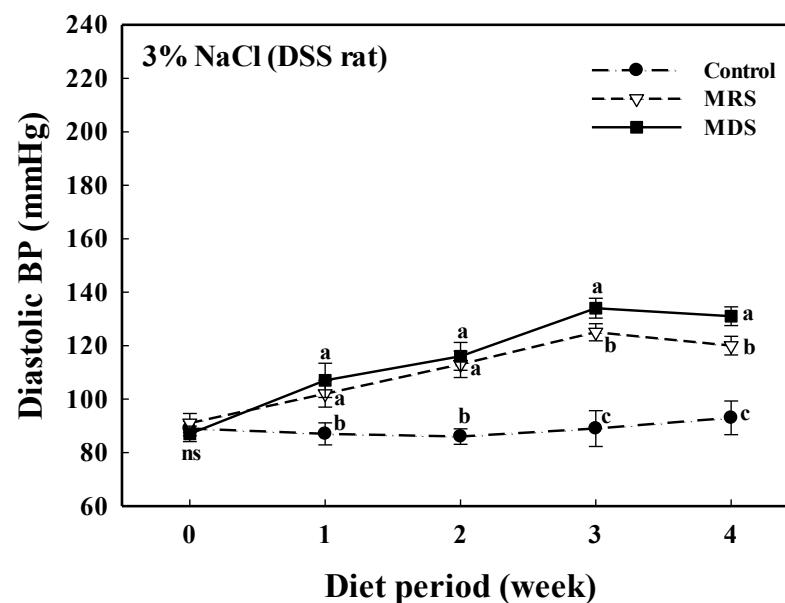
## Blood Pressure of DSS Rats

- 3% (w/w) NaCl contents of MRS and MDS -

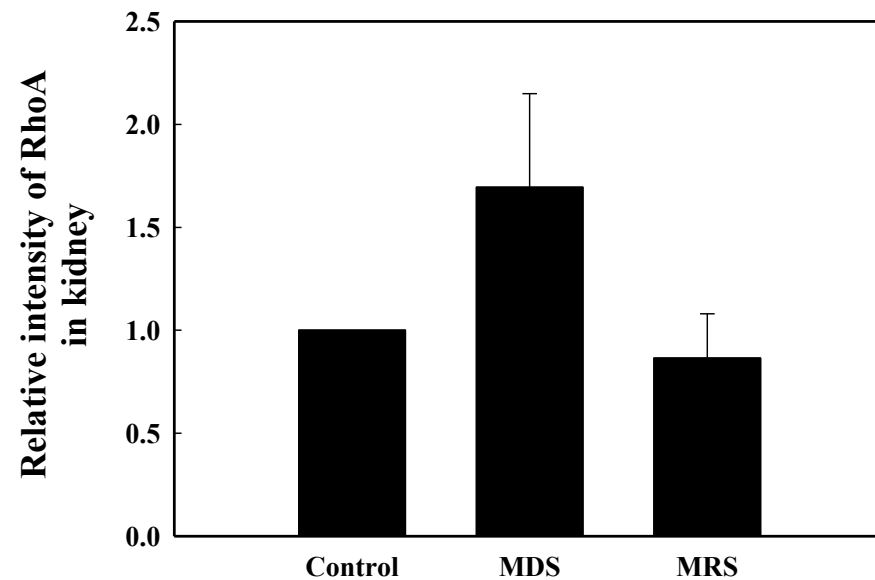
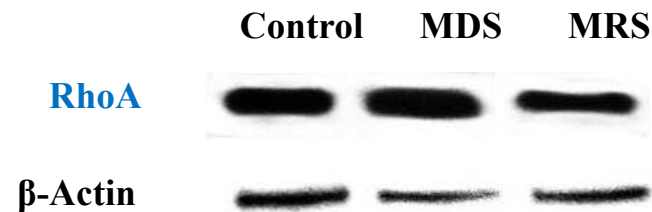
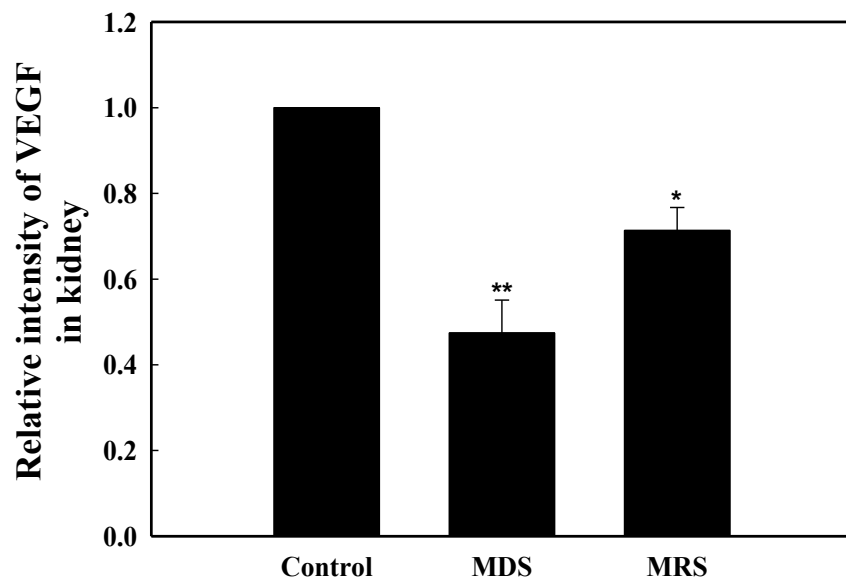
### Systolic BP



### Diastolic BP



MRS, mineral-rich solar sea salt; MDS, mineral-deficient salt



MRS, mineral-rich solar sea salt; MDS, mineral-deficient salt

## Effects of Mineral-rich Salt (MRS) and Bamboo salt (BS) on Blood Pressure

Mineral-rich salt



Bamboo tube



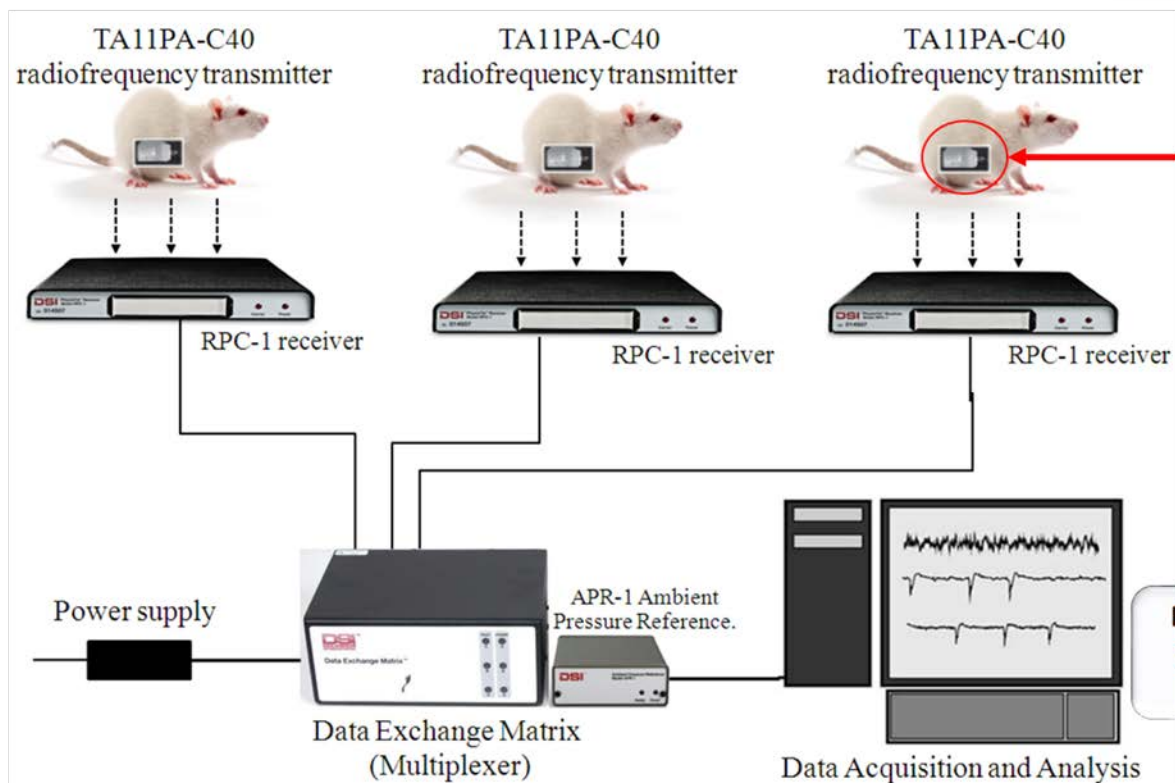
Roasting ( $>800^{\circ}\text{C}$ )

Bamboo salt



Various minerals (K, Mg, Ca, ...etc)

## Implantable Blood Pressure Telemetry Systems

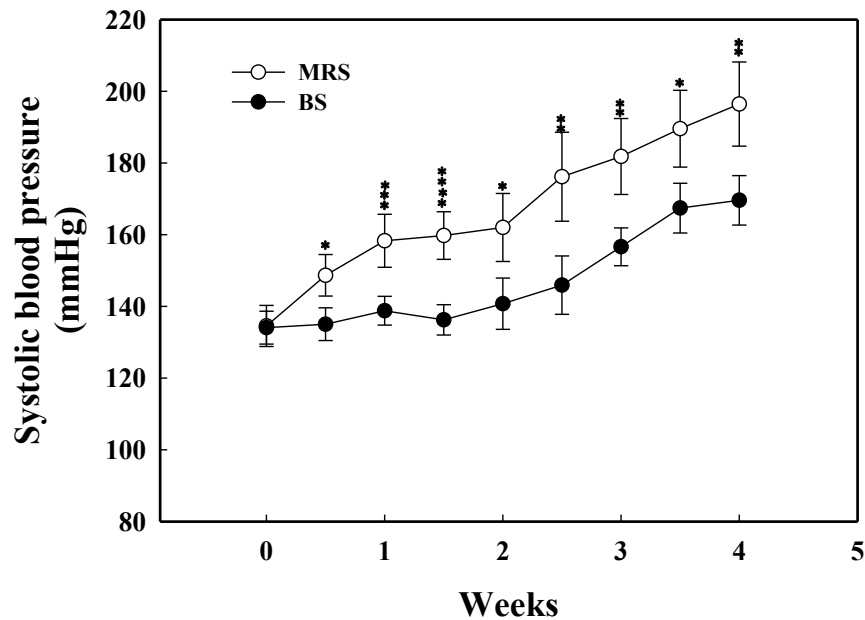


**PA-C40 transmitter and  
the wireless collection  
system**

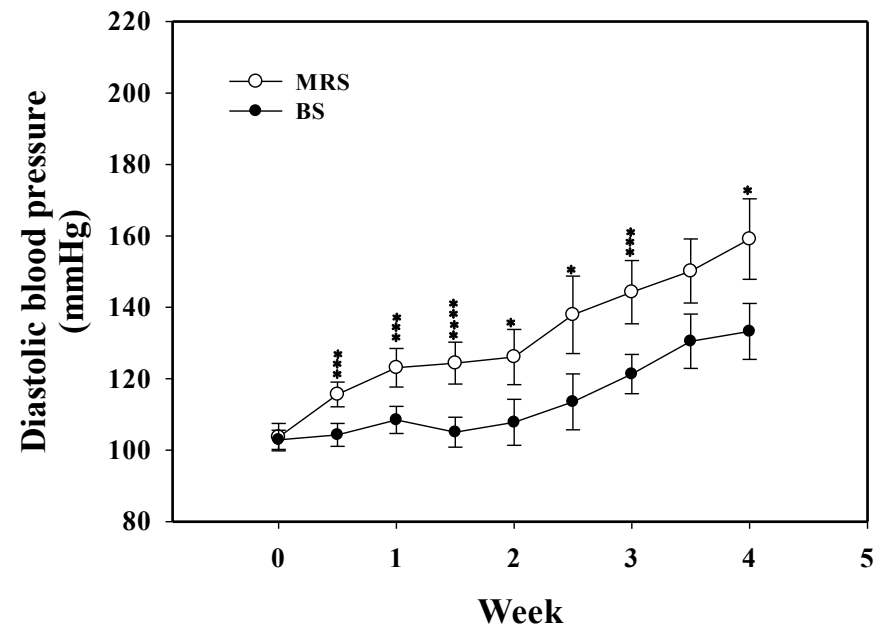
## Blood Pressure of DSS Rats

- 3% (w/w) NaCl contents of MRS and BS -

### Systolic BP



### Diastolic BP



\*  $p < 0.05$ , \*\*  $p < 0.03$ , \*\*\*  $p < 0.02$ , \*\*\*\*  $p < 0.01$

MRS, mineral-rich solar sea salt; BS, bamboo salt



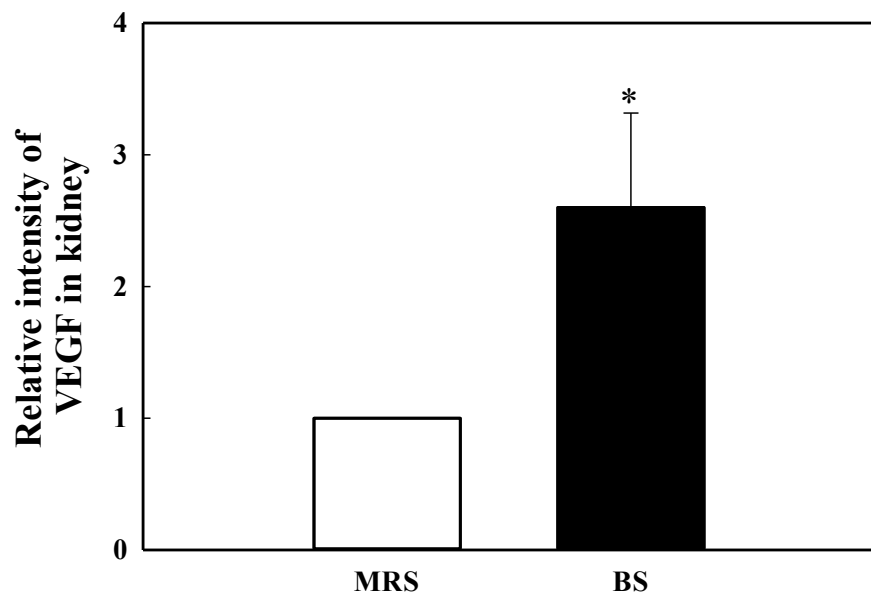
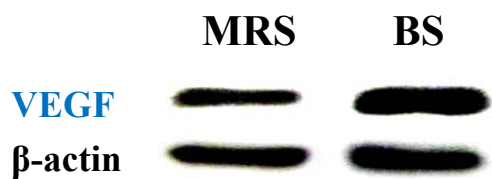
# WORLD SALT SYMPOSIUM

June 19-21, 2018

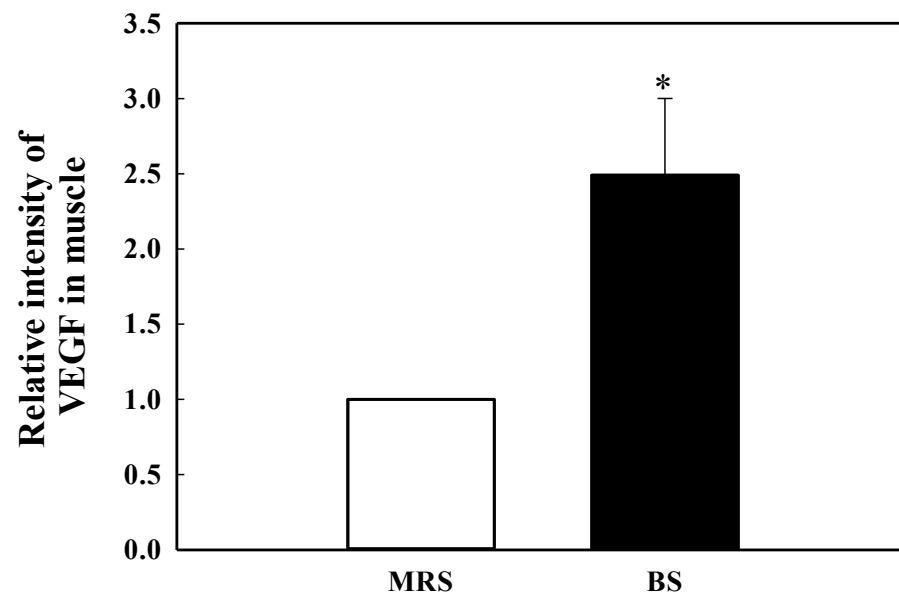
Park City UT, USA



## Kidney tissue



## Skeletal muscle



MRS, mineral-rich solar sea salt; BS, bamboo salt

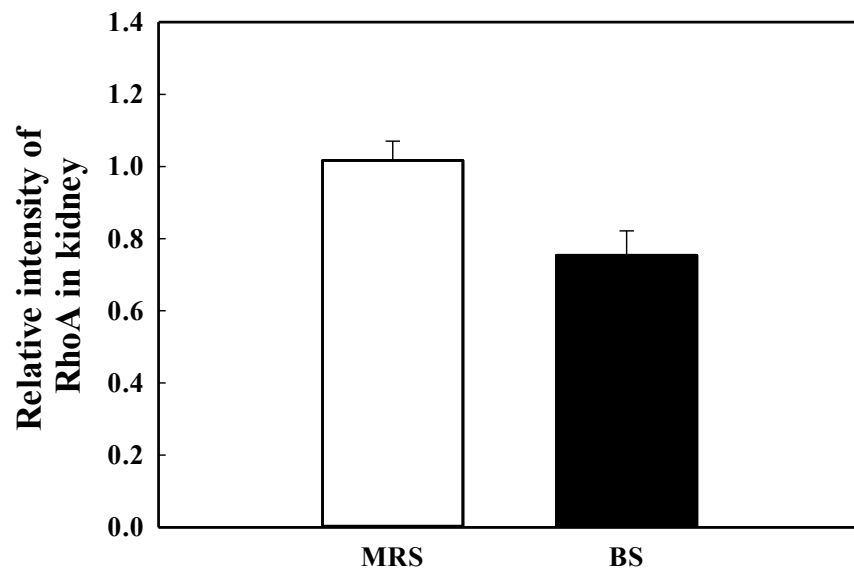
# WORLD SALT SYMPOSIUM

June 19-21, 2018

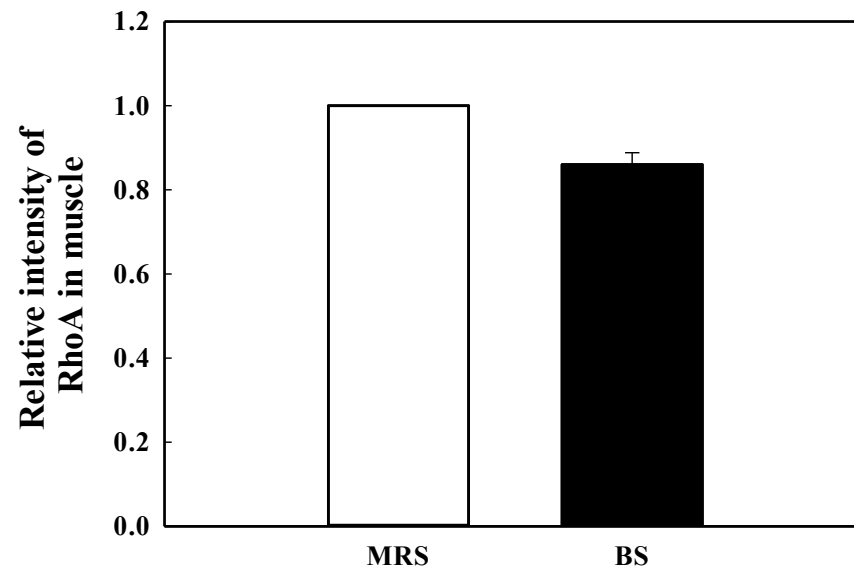
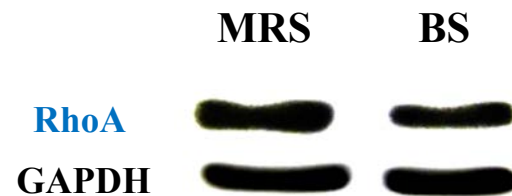
Park City UT, USA



## Kidney tissue



## Skeletal muscle



**MRS**, mineral-rich solar sea salt; **BS**, bamboo salt

# How **MRS** and **BS** reduce blood pressure?

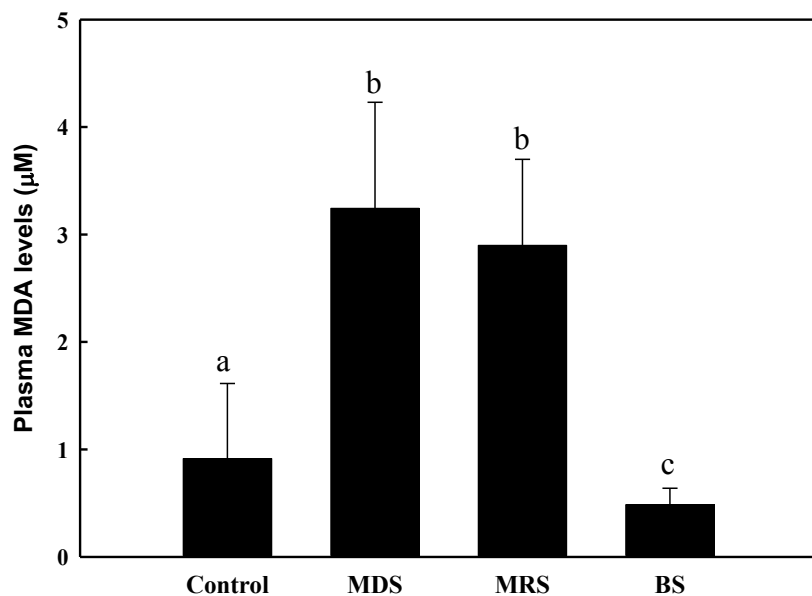
1. Oxidative Stress

2. Angiotensin II Production

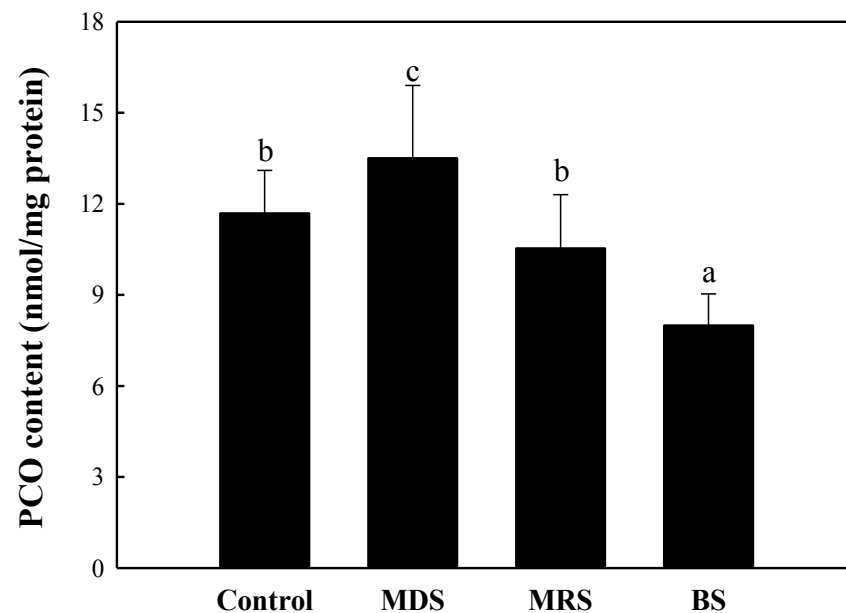
3. Endothelial Cell Dysfunction

## Oxidative stress

### Lipid oxidation



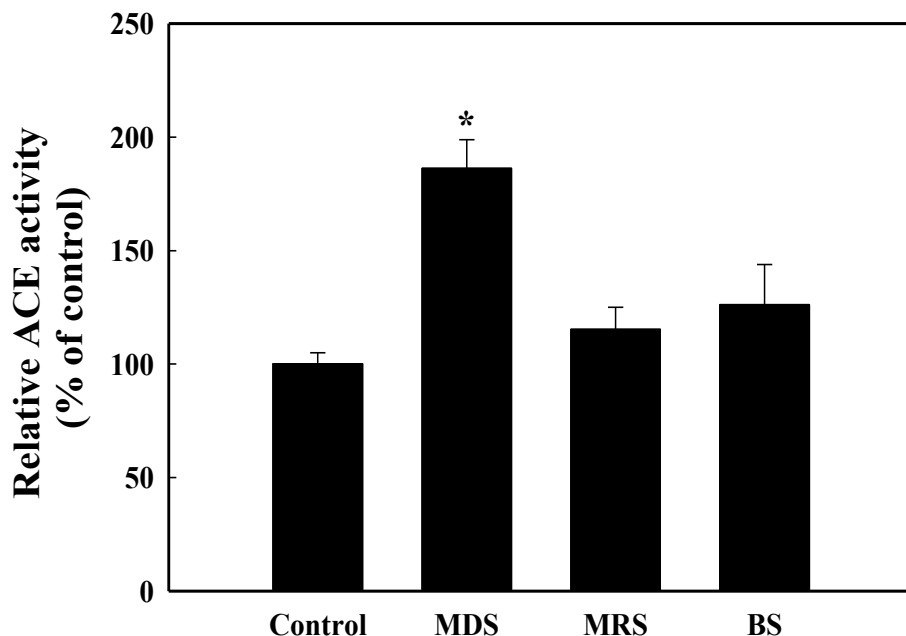
### Protein oxidation



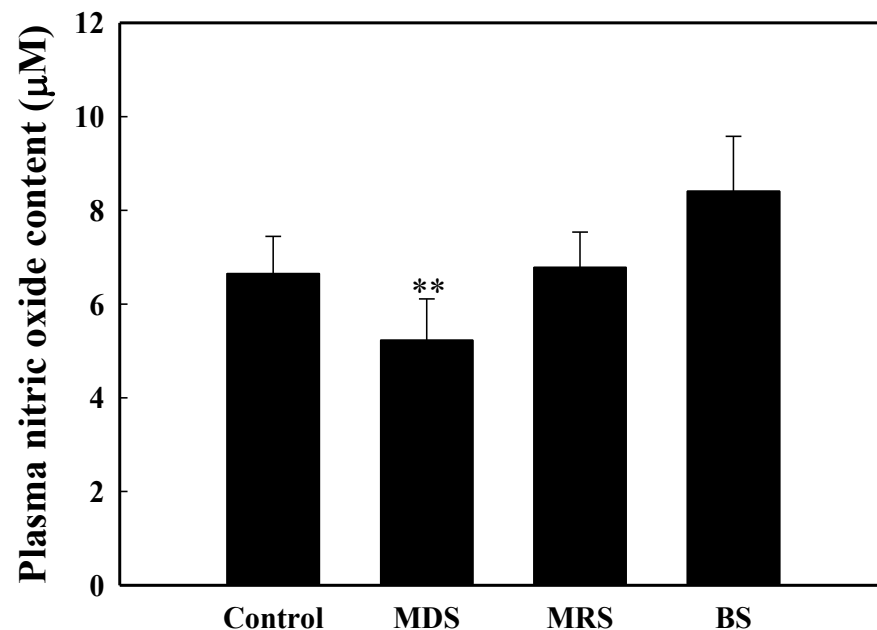
**Control**, normal diet; **MDS**, mineral-deficient salt, **MRS**, mineral-rich solar sea salt; **BS**, bamboo salt

## Angiotensin II Production

Plasma ACE Activity

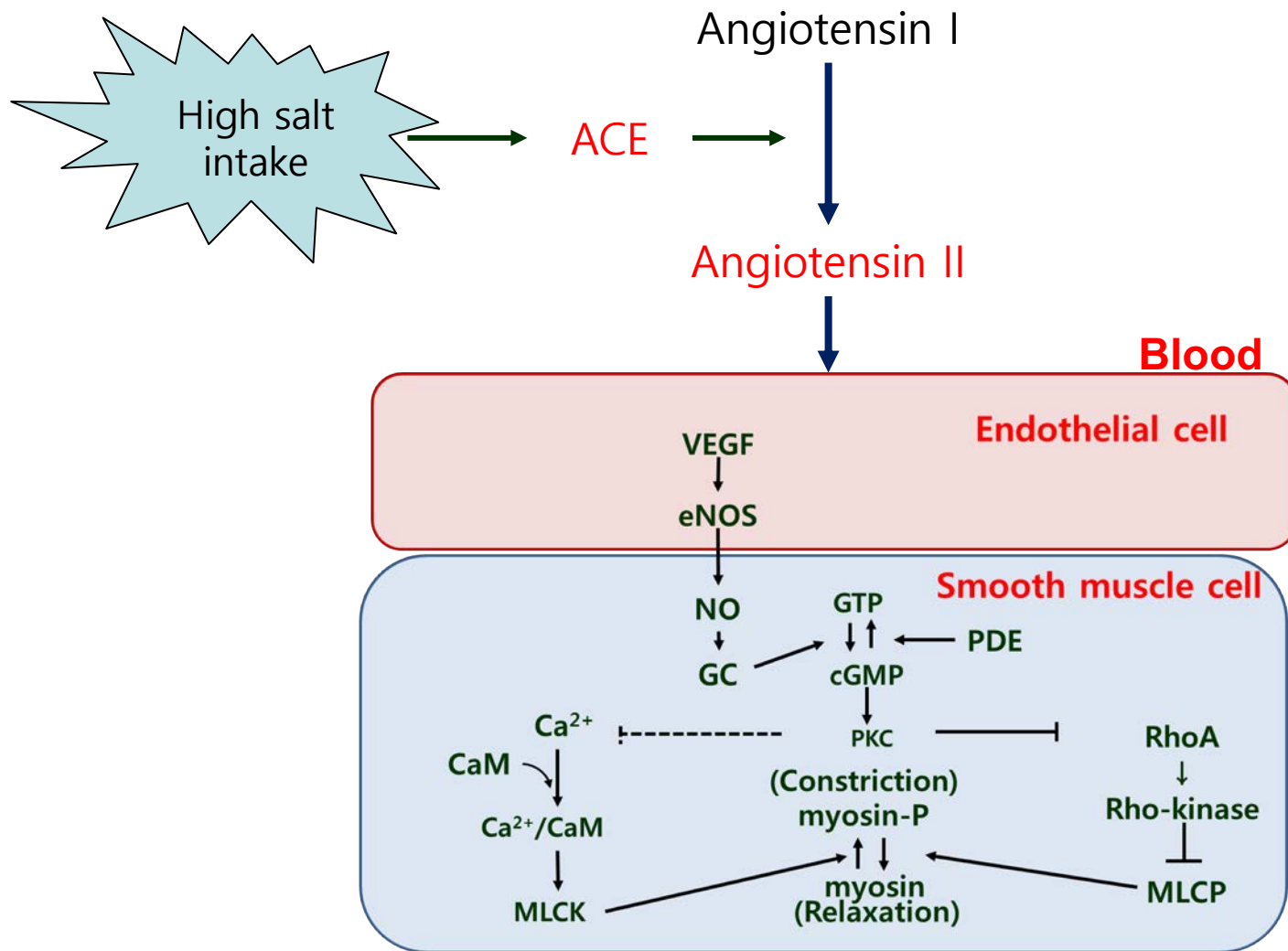


Plasma Nitric Oxide Content



\*  $p < 0.001$  vs another group, \*\*  $p < 0.05$  vs BS

**Control**, normal diet; **MDS**, mineral-deficient salt, **MRS**, mineral-rich solar sea salt; **BS**, bamboo salt





Thank you  
for your attention