Elevated Plasma Concentrations of Symmetrical dimethylarginine (SDMA) and Asymmetrical Dimethylarginine

Denise Brennan, Benjamin Margolis, M.D.
Department of Internal Medicine,
U of M Medical School, Ann Arbor, MI

Purpose: Elevated plasma concentrations of symmetrical dimethylarginine (SDMA) and asymmetrical dimethylarginine (ADMA) are repeatedly associated with kidney failure and both can be excreted in urine. Current literature asserts that a loss of renal elimination in kidney failure is responsible for the elevated ADMA & SDMA levels. We tested whether renal excretion is necessary for maintenance of plasma ADMA and SDMA using three procedures to alter renal function.

Methods: Sprague-Dawley rats underwent either sham operation, bilateral nephrectomy, ureteral ligation, or ureteral section under isoflurane anesthesia. Tail-snip blood samples (250μL) were taken before and at 6 or 12h intervals for 72h after operation. High performance liquid chromatography determined SDMA and ADMA concentrations. Sodium, potassium, creatinine, blood urea nitrogen (BUN) and body weight were also assessed.

Results: SDMA increased 25 times (0.23±0.03 to 5.68±0.30 μM) while ADMA decreased (1.17±0.08 to 0.73±0.08 μM) following nephrectomy. There was approximately 50% reduction of plasma ADMA in 48h was due to either bilateral nephrectomy or ligation however plasma ADMA was maintained in rats undergoing bilateral ureteral section. Creatinine and BUN increased and paralleled SDMA following nephrectomy. Sham animals showed no significant changes in either ADMA or SDMA.

Conclusions: Increased SDMA confirms continuous systemic production of SDMA and its obligatory renal excretion much like creatinine. In contrast, decreased plasma ADMA suggests that acute total nephrectomy alters systemic ADMA metabolism or that kidneys preferentially contribute to systemic ADMA production. Thus renal function is needed for SDMA elimination but not needed for ADMA elimination.

PLEASE READ & COMPLETE IN ITS ENTIRETY

Presenter's Name: Student Name
Address: Address of Student
Telephone numbers where you can be reached: day: (   ) Phone # of Student

 evening: (   ) Phone # of Student
Mentor's name and Department: Mentor Name, Department of Dermatology (sample)
Mentor’s Campus Address and Zip: Med Sci I C Wing #5101 (Sample)
Mentor’s Signature: __(Mentor Needs To Sign Abstract before Submitting)

School or hospital where work was done: The University of Michigan
Department in which work was done:

Fall Forum: November 2016 @ Mich. League
Poster Area: 2’8” x 3’4”
(poster instructions to be sent at a later date)

VERY IMPORTANT:
A completed abstract must be sent as an email attachment to sbrp.program@umich.edu. ALSO: A hard copy must be signed by your mentor and submitted to: Denise Brennan denisebr@umich.edu.