

Juan Y<sup>1</sup>, Chuang S<sup>2</sup>, Long C<sup>3</sup>, Huang C<sup>1</sup>, Levin R<sup>4</sup>, Liu K<sup>2</sup>

1. Department of Urology, Kaohsiung Medical University Hospital; Kaohsiung, Taiwan, 2. Department of Anatomy, College of Medicine, Kaohsiung Medical University, 3. Department of Obstetrics and Gynecology, Kaohsiung Municipal Hsia-Kang Hospital,, 4. Albany College of Pharmacy and Albany Medical College, Albany, New York, USA

## THE EFFECT OF L-ARGININE ON BLADDER DYSFUNCTION FOLLOWING OVARIECTOMY IN A RABBIT MODEL

### Hypothesis / aims of study

The present study was designed to investigate the effect of nitric oxide (NO) precursor, L-arginine, on bladder dysfunction following short term ovariectomy surgery.

### Study design, materials and methods

Twenty-eight New Zealand white female rabbits were separated into seven groups. Groups 1 to 6 underwent ovariectomy surgery. Among them, groups 1 and 2 received ovariectomy without treating with L-arginine. Groups 3, 4, 5 and 6 were given high L-arginine diet and were sacrificed 1, 3, 7 and 14 days after ovariectomy, respectively. Group 7 was served as the control group. The effects of L-arginine on the contractile of bladder tissues were determined in response to various stimulations. In addition, L-arginine effects on the expression of smooth muscle contractile regulatory proteins (Rho- kinase (ROK), protein kinase C potentiated inhibitor (CPI-17)) and actin associated proteins,( caldesmon (CaD) and calponin (CaP)) were studied by immunoblotting.

### Results

Ovariectomy significantly decreases contractile response to all forms of stimulation. Feeding rabbits L-arginine significantly increases contractile response at 1 day following ovariectomy but the response decreases to control level by 14 days. Ovariectomy increases both isoforms of CaD, CaP and CPI-17 expressions, L-arginine treatment induces ROK underexpression while CaP was overexpressed in the early few days of ovariectomy but returns to control level at 2 weeks ovariectomy.

### Interpretation of results

Our results imply that L-arginine has potential benefits to stimulate additional production of NO after ovariectomy. Feeding rabbits with L-arginine prevents both CaD and CPI-17 over-expression after ovariectomy, showing the protective effect of NO on smooth muscle from ovariectomy-induced cytoskeletal remodeling.

### Concluding message

Ovariectomy appreciably induced bladder dysfunction, and treatment with L-arginine have potential in the reversal of ovariectomy-induced bladder dysfunction, especially in the early few days following ovariectomy.

|   |   |
|---|---|
| <b><i>Specify source of funding or grant</i></b>  | <b>This research is supported in part by the Office of Research and Development Medical Research Service, Department of Veteran's Affairs; in part by NIH grant RO-1-DK 067114.</b> |
| <b><i>Is this a clinical trial?</i></b>   | <b>No</b>   |
| <b><i>What were the subjects in the study?</i></b>  | <b>ANIMAL</b>   |
| <b><i>Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?</i></b> | <b>Yes</b>  |
| <b><i>Name of ethics committee</i></b>  | <b>the Institutional Animal Care and Use Committee of the Stratton Veterans Affairs Medical Center</b>  |