## CLAIMS:

What is claimed is:

1. Use of citrulline in the manufacture of a medicament for maintaining the coupling of endothelial nitric oxide synthase (eNOS) to reduce the incidence or severity of cardiopulmonary bypass-induced pulmonary injury due to free radical formation in a patient during cardiopulmonary bypass whereby an effective amount of the medicament is to be administered to the patient before, during, and after the surgery,

   wherein the medicament to be administered during the surgery is added to hemoconcentration replacement fluid during the surgery to replenish filtered citrulline,

   wherein the medicament is an amount sufficient to reduce the uncoupling of endothelial nitric oxide synthase (eNOS).

2. The use of claim 1, wherein the effective amount of citrulline in the medicament is an amount sufficient to reduce the formation of free radicals.

3. The use of claim 1, wherein the effective amount of citrulline in the medicament is an amount sufficient to reduce the incidence or severity of cardiopulmonary bypass-induced pulmonary injury.

4. The use of claim 1, wherein the medicament to be administered prior to the surgery is to be administered at about 12 hours prior to the surgery.

5. The use of claim 1, wherein the surgery is to correct a cardiac defect.

6. The use of claim 1, wherein the medicament that is to be administered at the initiation of the surgery contains 100–500 mg/kg of citrulline.

7. The use of claim 1, wherein the amount of citrulline in the medicament to be added during the surgery is to be added at 100–500 μmol/L.

8. The use of claim 1, wherein the citrulline in the medicament to be administered after the surgery is to be administered to the patient for 12–48 hours after surgery, at a concentration of 100–500 μmol/L, optionally at a concentration of 100, 150, 200, 250, 300, 350, 400, 450, or 500 μmol/L, and optionally at an administration speed of 3–12 mg/kg/hour.

9. The use of claim 1, wherein the medicament is to be administered orally, intravenously, by inhalation, or a combination thereof.

10. The use of claim 1, wherein the patient's plasma citrulline level is raised above 100 μmol/L.

11. The use of claim 1, wherein the patient's plasma citrulline level is raised above 100 μmol/L postoperatively.

12. The use of claim 1, wherein the patient is a neonate, pre-adolescent, adolescent, or an adult.

13. The use of claim 1, wherein the patient is a preterm infant.

14. The use of claim 1, wherein the patient's intensive care unit (ICU) stay is decreased.

15. The use of claim 1, wherein the patient's intensive care unit (ICU) stay is decreased to less than 27 days.

16. An effective amount of citrulline for use in maintaining the coupling of endothelial nitric oxide synthase (eNOS) to reduce the incidence or severity of cardiopulmonary bypass-induced pulmonary injury due to free radical formation in a patient during cardiopulmonary bypass whereby an effective amount of citrulline is to be administered to the patient before, during, and after the surgery,

wherein the citrulline to be administered during the surgery is added to hemoconcentration replacement fluid during the surgery to replenish filtered citrulline, wherein the effective amount of citrulline is an amount sufficient to reduce the uncoupling of endothelial nitric oxide synthase (eNOS).