Supplemental Material and Supporting Data.

Supplemental Methods.

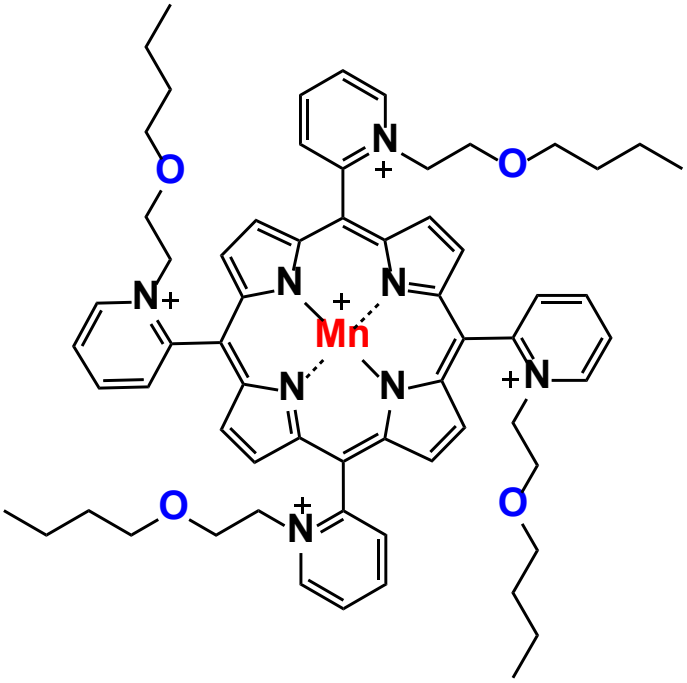
Window chamber surgery. Following anesthesia, All dorsal skin-fold window chamber surgery was carried out on anesthetized TS mice under sterile conditions with aseptic technique using a laminar flow hood. Animals were placed on a heated pad at 37ºC. General anesthesia was achieved with isoflurane (Butler Animal Health Supply, Dublin, OH), by adjusting the oxygen flowmeter to approximately 0.5-1.0 L/min, and isoflurane vaporizer to 3% for induction and 1% for maintenance. The back of anesthetized mouse was alternatively wiped with surgical sponges soaked in Hibiclens and then alcohol. Hair on the clean area was shaved, and the rest of hair was removed using hair removal cream. The area was cleaned again with Hibiclens and then alcohol. A window chamber consisting of a double-sided titanium frame was surgically implanted into the dorsal skin fold. Surgery involved careful removal of the epidermal and dermal layers of one side of a dorsal skin flap, exposing blood vessels of the subcutaneous tissue adjacent to the striated muscles of the opposing skin fold, and then securing the two sides of the chamber to the skin using stainless steel screws and sutures. Sutures were used to secure the window chamber, which will be retained for the duration of the experiment to maintain the window chambers. A glass window was placed in the chamber to cover the exposed tissue and secured with a snap ring.

Primers. Sequences of primers used to assess gene expression are as follows: VCAM-1 primer forward, 5′-AGTTGGGGATTCGGTTGTTCT-3′ and reverse, 5′-CCCCTCATTCCTTACCACCC-3′; ICAM-1 primer forward, 5′-AACCTCCACATCCCCTGTTTT -3′ and reverse, 5′-GCCCTGGCATGGATAACCA-3′; P-selectin primer forward, 5′-GTCTGTCCCGTCACTGGATAC-3′ and reverse, 5′-

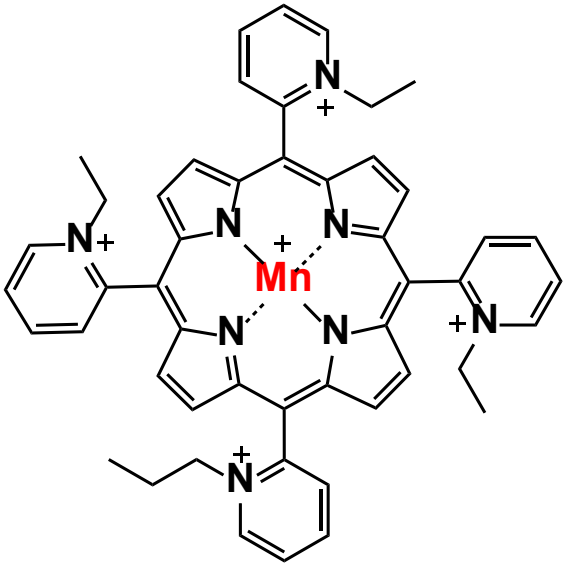
TCCTCTCTTACCGGGTTACCA-3′; and 36B4 forward, 5'-ATCCCTGACGCACCGCCGTGA-3′ and reverse, 5'- AGTGAGGCACTGAGGCAACAG-3′.

Supplemental Data and Supporting Movies

Supplemental Figure 1. Chemical structures of the Mn porphyrins.



MnTnBuOE-2-PyP^{5+}



MnTE-2-PyP^{5+}

Supplemental Movies. Movies represent original video segments supporting data presented in Figure 2. Movies were merged to show murine SSRBC and leukocyte circulatory behavior in the vasculature at different locations and over time. **Movie 1. Effect of vehicle treatment on reversing established cell adhesion, and leukocyte rolling *in vivo***. Treatment of TS mice with vehicle after the inflammatory trigger of vaso-occlusion showed extensive cell (leukocyte and SSRBC) adhesion in small post-capillary vessels and arterioles, and leukocyte rolling, and occlusion of some vessel segments with evident blood stasis. **Movie 2. Effect of MnBuOE on reversing occurring cell adhesion and vaso-occlusion *in vivo*.** Treatment of TS mice with 0.2 mg/kg MnBuOE after establishment of vaso-occlusion reversed cell (leukocyte and SSRBC) adhesion and vaso-occlusion, which led to restitution of blood flow. **Movie 3. Effect of MnE on reversing established cell adhesion and vaso-occlusion *in vivo*.** SSRBC and leukocyte adhesion in inflamed vessels was reversed, and leukocyte rolling was lowered following treatment with MnE at 2 mg/kg. This resulted, in restoration of blood flow in inflamed venules.