# Copper Oxide Nanoparticles Induce Pulmonary Inflammation and Exacerbate Asthma via the TXNIP Signaling Pathway

**Woong-Il Kim [1], So-Won Pak [1], Se-Jin Lee [1], Sin-Hyang Park [1], Je-Oh Lim [2], In-Sik Shin [1], Jong-Choon Kim [1,*] and Sung-Hwan Kim [3,*]**

[1] College of Veterinary Medicine and BK21 FOUR Program, Chonnam National University, Gwangju 61186, Republic of Korea; dvmwoong@gmail.com (W.-I.K.); dvmpsw@gmail.com (S.-W.P.); xhdhksdl123@naver.com (S.-J.L.); shinhyang23@gmail.com (S.-H.P.); dvmmk79@gmail.com (I.-S.S.)
[2] Herbal Medicine Resources Research Center, Korea Institute of Oriental Medicine, Naju 58245, Republic of Korea; dvmljo@kiom.re.kr
[3] Jeonbuk Department of Inhalation Research, Korea Institute of Toxicology, Jeongup 56212, Republic of Korea
* Correspondence: toxkim@jnu.ac.kr (J.-C.K.); sunghwan.kim@kitox.re.kr (S.-H.K.); Tel.: +82-62-530-2827 (J.-C.K.); +82-63-570-8757 (S.-H.K.)

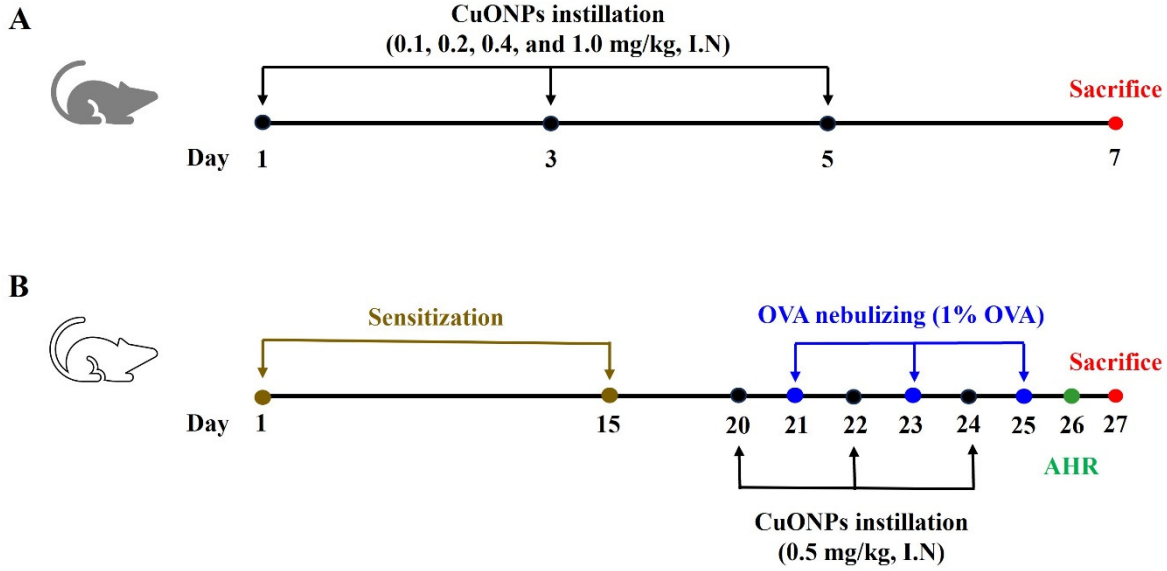


**Figure S1.** Illustration showing the experimental design. (**A**) CuONPs-induced pulmonary toxicity experimental schedule. (**B**) CuONPs-induced asthma exacerbation experimental schedule.

**Table S1.** Real-time PCR primer sequences.

| Genes | Forward Primer (5′→3′) | Reverse Primer (5′→3′) |
|---|---|---|
| *IL-1β* | AGC CAG GAC AGT CAG CTC TC | ACT TCT TGC CCC CTT TGA AT |
| *IL-6* | ATG CAA TAA CCA CCC CTG AC | ATC TGA GGT GCC CAT GCT AC |
| *TNF-α* | CAA AGT AGA CCT GCC CAG AC | GAC CTC TCT CTA ATC AGC CC |
| *GAPDH* | CAA AAG GGT CAT CAT CTC TG | CCT GCT TCA CCA CCT TCT TG |

IL-1β, interleukin-1β; IL-6, interleukin-6; TNF-α, tumor necrosis factor-alpha; and GAPDH, glyceraldehydes-3-phosphate dehydrogenase.