Data were collected with various laboratory instruments and equipments. Such as: Field emission scanning electron microscope (SEM) was measured on SU8020 (HITACHI, Japan). Inductively coupled plasma mass spectrometry (ICP-MS, Agilent 7500ce, America). Nikon Eclipse Ti-S inverted fluorescence microscope (Nikon Corporation, Japan). Upright microscope (Nikon ECLIPSE Ci, Nikon Corporation). Fully automatic chemiluminescence/fluorescence image analysis system (Tanon 5200, Shanghai Tanon). Portable dissolved oxygen analyzer (JPBJ-608, Shanghai INESA).

Provide your data availability statement here.

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Last updated by author(s): Oct 9, 2022
No statistical methods were used to pre-determine sample sizes. Based on the literature and our previous studies, for each experiment we used at least \( n = 3 \) replicates to calculate the statistical values for each analysis.

**Data exclusions**

No data were excluded from this study.

**Replication**

All experiments were repeated at least three times to reliably support the conclusions stated in the manuscript.

**Randomization**

The mice were randomly assigned to cages and then divided into individual experimental groups for further treatment.

**Blinding**

For the cell-based experiments, blinding was not performed because the investigator had to know the group to which the drug was administered or the group performing the assay. Blinding was not performed in the mouse experiments because the researchers needed to know the treatment group in order to administer the drug. However, none of these objective factors affect the conclusions of the article.

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**Antibodies**

NF-\( \kappa \)B p65 antibody (catalog number: ab76302, clone number: EP2294Y, abcam);

TNF-\( \alpha \) antibody (catalog number: ab183218, clone number: EPR19147, abcam);

MMP-9 antibody (catalog number: ab38898, abcam);

GAPDH antibody (catalog number: AF0006, beyotime)

All antibodies were commercially available and were validated by the supplier. All antibodies were used in the study according to the profile of manufacturers.

**Eukaryotic cell lines**

Policy information about [cell lines](#).

**Cell line source(s)**

The cell lines of human umbilical vein endothelial cell HUVEC and mouse macrophage cell line Raw 264.7 were purchased from Procell Life Science & Technology, China.

**Authentication**

Raw 264.7 was validated by the supplier by short tandem repeat (STR) analysis. HUVEC was identified by the supplier by CD31 immunofluorescence.

**Mycoplasma contamination**

All cell lines tested negative for mycoplasma contamination.
Six-week-old male ApoE-/- mice were obtained from Cavens Laboratory Animals Co., China. Mice were housed in an IVC system with a temperature of 23-25°C and a humidity of 60%-70%. The light cycle of the animal room is 12 hours of light and 12 hours of darkness.

Commonly misidentified lines were used in this study.

Animals and other organisms

Policy information about studies involving animals: ARRIVE guidelines recommended for reporting animal research

| Laboratory animals | Six-week-old male ApoE-/- mice were obtained from Cavens Laboratory Animals Co., China. RRID: IMSR_JAX:00052. Mice were housed in an IVC system with a temperature of 23-25°C and a humidity of 60%-70%. The light cycle of the animal room is 12 hours of light and 12 hours of darkness. |
| Wild animals        | No wild animals were used. |
| Field-collected samples | This study did not involve samples collected from the field. |
| Ethics oversight    | All animal studies were conducted in accordance with the regulations and guidelines of the Medical Research Ethics Committee of Chongqing Medical University. All animal experiments procedures and protocols were approved by the Experimental Animal Center of Chongqing Medical University (SCXK2018-0003). |

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Flow Cytometry

Plots

Confirm that:

- The axis labels state the marker and fluorochrome used (e.g. CD4-FITC).
- The axis scales are clearly visible. Include numbers along axes only for bottom left plot of group (a 'group' is an analysis of identical markers).
- All plots are contour plots with outliers or pseudocolor plots.
- A numerical value for number of cells or percentage (with statistics) is provided.

Methodology

Sample preparation: The cells were rinsed three times with PBS and then detached from the well plate for flow cytometry analysis.

Instrument: CytoFLEX flow cytometer

Software: CytExpert Version 2.3.0.84 was used for flow cytometry data collection, FlowJo_V10 was used for flow cytometry data analysis.

Cell population abundance: Flow cytometry was used for quantitative analysis only. At least 10,000 cells were analyzed for each sample.

Gating strategy: Generally, the initial cell population was gated by FSC/SSC. The gate was set to exclude cell debris and dead cells.

Tick this box to confirm that a figure exemplifying the gating strategy is provided in the Supplementary Information.