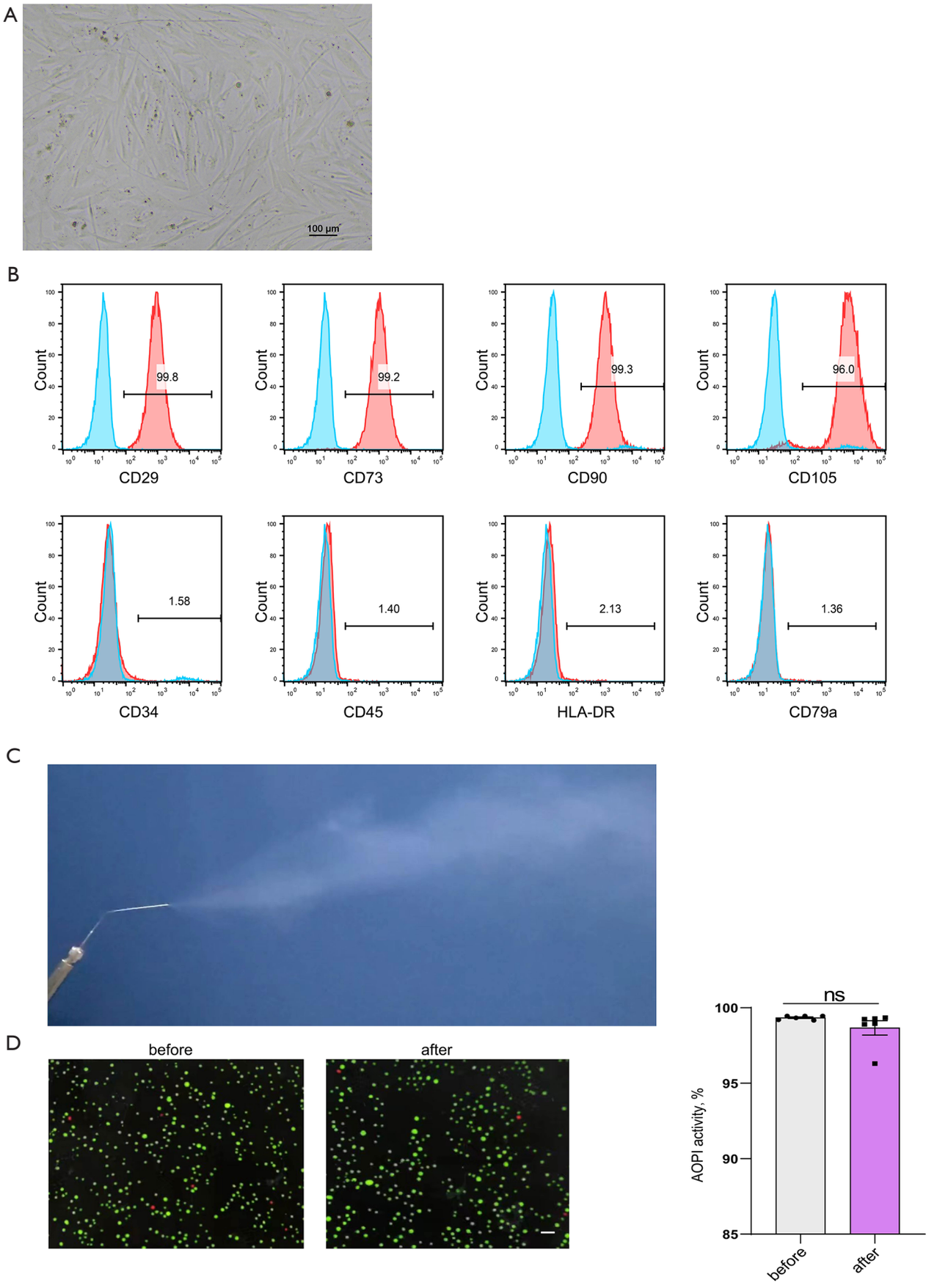


**Figure S1** Intratracheal injection of identified umbilical cord mesenchymal stem cells with a nebulizing syringe. (A) Bright-field images of umbilical cord MSCs with long fusiform and shoal-like distribution. (B) Flow analysis of the surface markers of umbilical cord MSCs showed that CD29, CD73, CD90, and CD105 were positive, while CD34, CD45, HLA-DR, and CD79a were negative (blue represents blank; red represents samples labeled with antibodies). (C) MSCs were nebulized with a nebulizing syringe. (D) The activity of MSCs before and after nebulization was compared by AOPI staining, scale bar: 25 μm, n=6, ns, P>0.05. MSC, mesenchymal stem cell; AOPI, acridine orange propidium iodide.

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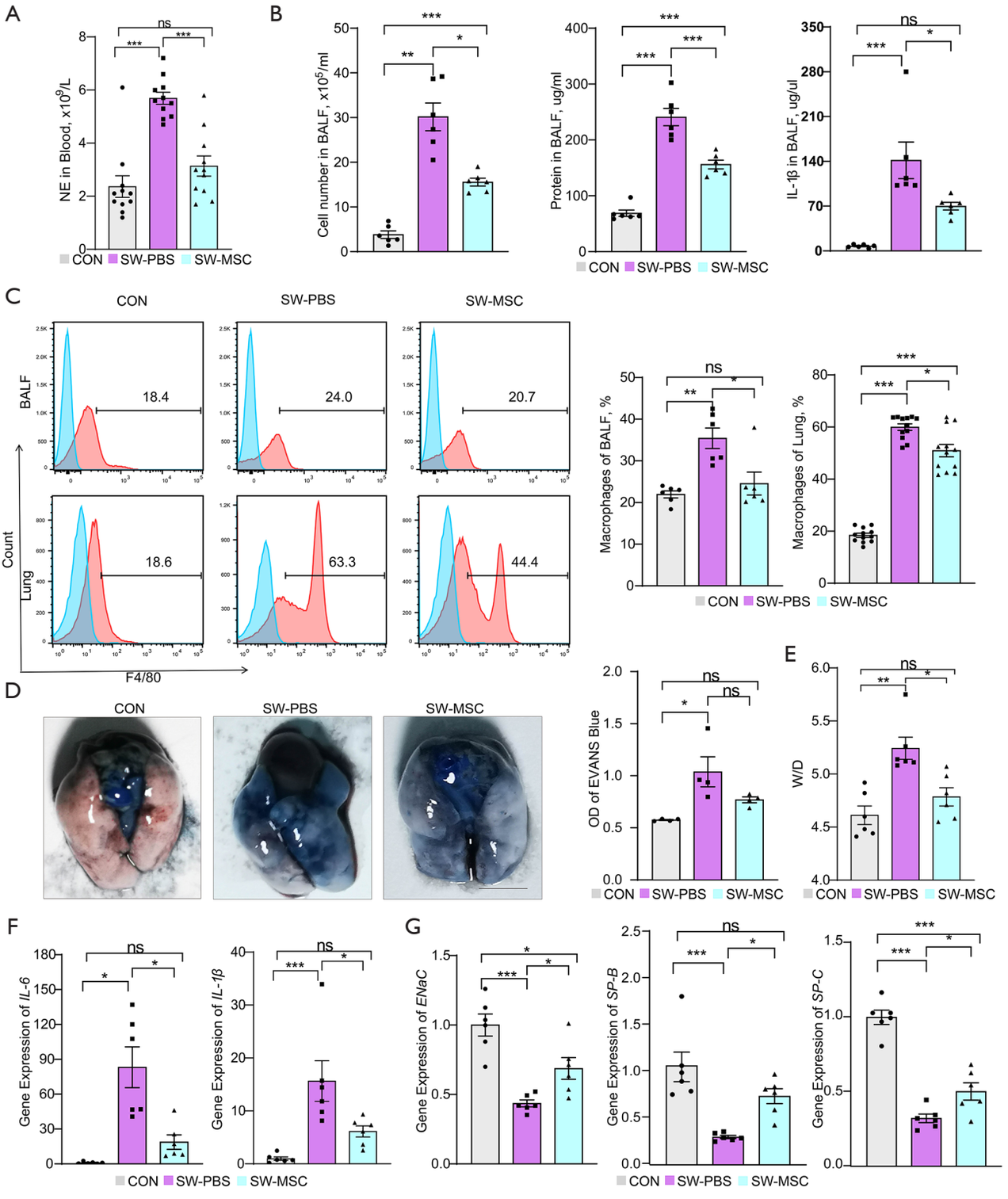


**Figure S2** Mesenchymal stem cells effectively improved SWD-ALI. (A) Quantification of the neutrophils in the blood, n=11, ns, P>0.05; ***, P<0.001. (B) Quantification of total number of cells, total protein and IL-1β in the BALF, n=6, ns, P>0.05; *, P<0.05; **, P<0.01; ***, P<0.001. (C) The percentages of BALF and lungs macrophages in each group were analyzed by flow cytometry, and the macrophages in BALF and lungs were compared among the groups, n=6 (BALF), n=12 (lung), ns, P>0.05; *, P<0.05; **, P<0.01; ***, P<0.001 (blue represents blank; red represents samples labeled with antibodies). (D) Photographs showed lung vascular permeability, which was assessed by Evans blue accumulation in the lung tissues, and the levels of Evans blue dye were assessed by measuring absorbance at 620 nm, scale bar: 5 mm, n=4; ns, P>0.05; *, P<0.05. (E) Lung vascular permeability was assessed by the lung wet to dry (W/D) ratio, n=6, ns, P>0.05; *, P<0.05; **, P<0.01. (F,G) The RNA levels of *IL-6*, *IL-1β*, *ENaC*, *SP-B* and *SP-C* in lung tissues were detected by qPCR, n=6, ns, P>0.05; *, P<0.05; ***, P<0.001. CON, control group; SW-PBS, seawater drowning + phosphate buffer solution group; SW-MSC, seawater drowning + mesenchymal stem cells group; SWD-ALI, seawater drowning induced acute lung injury; BALF, bronchoalveolar lavage fluid.

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**Video S1** Mesenchymal stem cell treatment alleviates seawater drowning induced lung injury by inhibiting the TNFα/Snail/EMT pathway.

**Table S1** Antibodies used for flow cytometry

| Antigen | Source | Dilution | Identifier |
|---|---|---|---|
| HLA-DR (APC) | Invitrogen | 1:100 | 47-9956-42 |
| CD45 (APC) | Invitrogen | 1:100 | 17-0459-42 |
| CD73 (APC) | Invitrogen | 1:100 | 17-0739-42 |
| CD29 (APC) | Invitrogen | 1:100 | 17-0299-42 |
| CD79a (APC) | BioLegend | 1:100 | 986502 |
| CD105 (PE) | Invitrogen | 1:100 | 12-1051-82 |
| CD90 (PE) | Invitrogen | 1:100 | 12-0909-42 |
| CD34 (PE) | BioLegend | 1:100 | 378603 |
| CD11b (FITC) | BioLegend | 1:50 | 101206 |
| F4/80 (PerCP-Cy5.5) | BioLegend | 1:50 | 123128 |
| ly6G (PE-Cy7) | BioLegend | 1:50 | 127618 |

**Table S2** Primary antibodies used for Western blotting

| Antigen | Host | Source | Dilution | Identifier |
|---|---|---|---|---|
| Snail | Rabbit | Cell Signaling Technology | 1:1000 | 3879 |
| Slug | Rabbit | Cell Signaling Technology | 1:1000 | 9585 |
| E-cadherin | Rabbit | Cell Signaling Technology | 1:1000 | 3195 |
| N-cadherin | Rabbit | Cell Signaling Technology | 1:1000 | 13116 |
| Claudin-1 | Rabbit | Cell Signaling Technology | 1:1000 | 13255 |
| TNFα | Rabbit | ABclone | 1:1000 | A0277 |
| GAPDH | Rabbit | Cell Signaling Technology | 1:20000 | 5174 |

**Table S3** Secondary reagents used for Western blotting

| Item | Source | Dilution |
|---|---|---|
| Anti-rabbit | Cell Signaling Technology | 1:20000 |

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**Table S4** Primary antibodies used for immunofluorescence

| Antigen | Host | Source | Dilution | Identifier |
|---|---|---|---|---|
| Snail | Rabbit | Servicebio | 1:3000 | GB11260 |
| Slug | Rabbit | Servicebio | 1:2000 | GB115172 |
| TNFα | Rabbit | Servicebio | 1:2000 | GB11188 |
| SP-C | Rabbit | Servicebio | 1:5000 | GB114059 |
| E-cadherin | Rabbit | Servicebio | 1:1000 | GB11082 |
| N-cadherin | Rabbit | Servicebio | 1:1000 | GB12135 |
| DAPI | — | Servicebio | 2 μg/mL | G1012 |

**Table S5** Secondary reagents used for immunofluorescence

| Items | Conjugate(s) | Source | Identifier |
|---|---|---|---|
| TSAPLus fluorescent double staining kit | Alexa Fluor 488/555 | Servicebio | G1226 |
| TSAPLus fluorescent 4-label 5-color staining kitAnti-Rabbit IgG | Alexa Fluor 440/488/594/647 | Servicebio | G1255 |

**Table S6** Other main reagents used in this experiment

| Items | Source | Identifier |
|---|---|---|
| UC-MSC Adipogenic Induction Medium | OriCell | HUXUC-90021 |
| UC-MSC Chondrogenic Induction Medium | OriCell | HUXUC-90031 |
| UC-MSC Osteoblast Medium | OriCell | HUXUC-90041 |
| Serum-free mesenchymal stem cell medium | Beijing Sanly Sci-Tech | 1208 |
| 1640 medium | Gibco | C11875500BT |
| TNFα ELISA kit | Raybiotech | P06804 |
| IL-1β ELISA kit | Raybiotech | P10749 |

**Table S7** Sequence of specific primers used for qPCR analysis

| Species | Genes | Forward sequence (5'→3') | Reverse sequence (5'→3') |
|---|---|---|---|
| Mouse | *Gapdh* | ACTCCACTCACGGCAAATTC | TCTCCTATGGTGGTGACGACA |
| | *IL-1β* | GCAACTGTTCCTGAACTCAACT | ATCTTTTGGGGTCCGTCAACT |
| | *IL-6* | GGGAGCGTATCATCTGCGTT | AGTCAGGAGGTTTGTCCTTGT |
| | *TNFα* | CCCCAAAGGGATGAGAAGTTCC | TTTGCTACGACGTGGGCTA |
| | *SP-B* | CTGCTTCCTACCCTCTGCTG | CTTGGCACAGGTCATTAGCTC |
| | *SP-C* | ATGGACATGAGTAGCAAAGAGGT | CACGATGAGAAGGCGTTTGAG |
| | *ENaC* | CCTTCTCCTTGGATAGCCTGG | CAGACGGCCATCTTGAGTAGC |
| Human | *GAPDH* | TCTCCTCTGACTTCAACAGCGAC | CCCTGTTGCTGTAGCCAAATTC |
| | *TNFα* | CTCCTCACCCACACCATCAGCCGCA | ATAGATGGGCTCATACCAGGGCTTG |
| | *Snail (SNAI 1)* | TGCTCATCTGGGACTCTGTC | AAGCCTGGGAAGGCAGCATA |
| | *Slug (SNAI 2)* | CAACGCCTCCAAAAAGCCAA | ACTCACTCGCCCCAAAGATG |

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