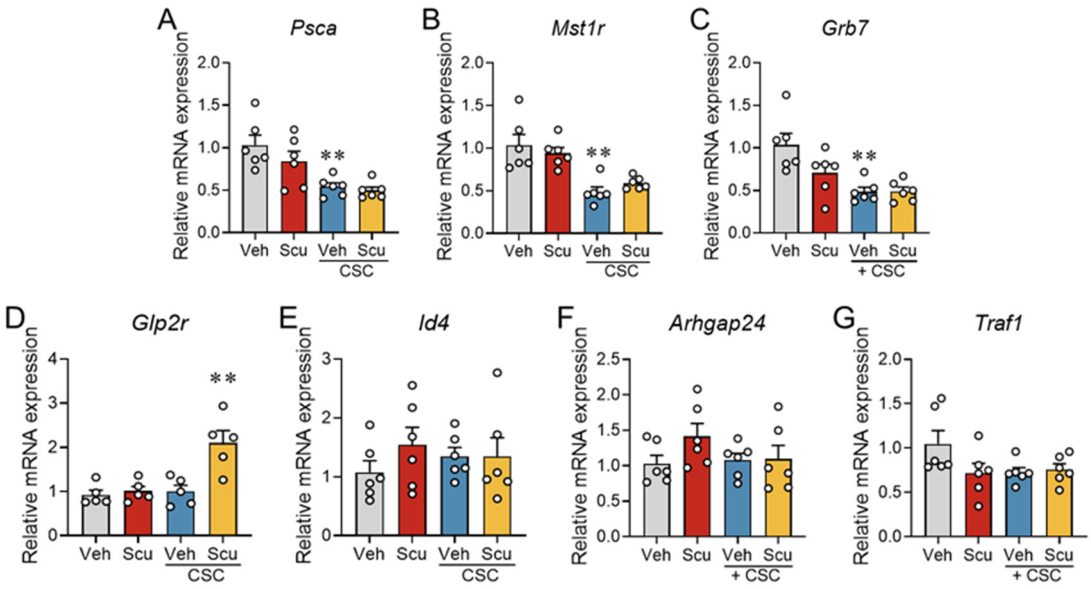
Scutellarein from *Erigeron breviscapus* inhibits apoptosis-mediated epithelial barrier disruption and alleviates cigarette smoke-induced lung injury

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Supplementary Figure S1. Genes Validated to be Unaffected by CSC. Effects of CSC (50 μg/mL) and Scu (1 μM) on the mRNA expression of *Psca* **(A)**, *Mst1r* **(B)**, *Grb7* **(C)**, *Glp2r* **(D)**, *Id4* **(E)**, *Arhgap24* **(F)** and *Traf1* **(G)**. Data represent mean ± SEM. N = 5-6 wells.

Supplementary Table S1. Overlapping differentially expressed genes (DEGs) among the Veh, CSC, and Scu+CSC groups and their functional analysis.

Gene Name	Primary Function (Summary)*
Acot12 (Acyl-CoA thioesterase 12)	Enables ATP binding activity and acetyl-CoA hydrolase activity. Acts upstream of or within acetyl-CoA metabolic process .
Aoc3 (Amine oxidase copper-containing 3 (vascular-adhesion-protein-1, VAP-1))	Enables identical protein binding activity, metal ion binding activity and protein heterodimerization activity. Involves in eating behavior, leukocyte migration involved in inflammatory response and positive regulation of D-glucose transmembrane transport .
Apoh (Apolipoprotein H (β_2-glycoprotein I))	β_2-glycoprotein I that binds phospholipids and serves as the major antigen in antiphospholipid syndrome .
Arhgap20 (Rho-GTPase-activating protein 20)	Rac/Cdc42-specific GAP that restrains dendritic-spine formation and neuronal plasticity .
Arhgap24 (Rho-GTPase-activating protein 24)	Rac/Cdc42 GAP suppressing lamellipodia formation and tumor-cell invasion .
Bcat1 (Branched-chain-amino-acid transaminase 1)	Enables branched-chain-amino-acid transaminase activity. Acts upstream of or within branched-chain amino acid catabolic process .
Calhm4 (calcium homeostasis modulator family member 4)	Enables monoatomic cation channel activity. Involves in ATP export and monoatomic ion

	transmembrane transport .
Ces1f (Carboxylesterase 1F)	A hepatic inflammatory inhibitory molecule, influencing KC polarization phenotypic homeostasis .
Col6a3 (Collagen type VI alpha-3 chain)	Collagen VI α3 chain anchoring basement membranes to interstitial matrix .
Cyp26a1 (Cytochrome P450 family 26 subfamily A member 1)	Retinoic-acid-degrading cytochrome P450 that sharpens embryonic anterior–posterior gradients .
Degs2 (Δ(4)-desaturase, sphingolipid 2)	Enables sphingolipid delta-4 desaturase activity. Acts upstream of or within sphinganine metabolic process and sphingolipid biosynthetic process .
Dnase1l2 (Deoxyribonuclease 1-like 2)	Secreted DNase essential for chromatin degradation and prevention of hair-follicle plugging .
Ecscr (Endothelial-cell-specific chemotaxis regulator)	Acts upstream of or within negative regulation of angiogenesis .
Fgf16 (Fibroblast growth factor 16)	FGF ligand indispensable for embryonic cardiomyocyte proliferation and metabolic homeostasis .
Fgf23 (Fibroblast growth factor 23)	Encodes a member of the fibroblast growth factor family. The encoded protein regulates phosphate homeostasis and vitamin D metabolism .
Gdap1l1 (Ganglioside-induced differentiation-associated protein 1-like 1)	Ganglioside-induced differentiation-associated protein-1-like-1 maintaining mitochondrial

	dynamics in peripheral nerves .
Gja6 (Gap-junction protein alpha-6 (connexin-46))	Gap-junction protein (connexin-46) forming lens fibre-cell intercellular channels; mutations cause cataract .
Glp2r (Glucagon-like peptide 2 receptor)	GLP-2 receptor that drives intestinal crypt-cell proliferation and enhances epithelial barrier function .
Gm3629 (Predicted gene model 3629)	Gene with unknown functions.
Gpr20 (G-protein-coupled receptor 20)	Enables G protein-coupled receptor activity and involves in G protein-coupled receptor signaling pathway .
Grb7 (Growth-factor-receptor-bound protein 7)	Enables identical protein binding activity; phosphatidylinositol binding activity and protein kinase binding activity. Involves in negative regulation of translation and stress granule assembly .
H2ac18 (H2A clustered histone 18)	Replication-dependent H2A histone variant involves in nucleosome assembly and transcriptional control .
H2bc3 (H2B clustered histone 3)	Replication-dependent H2B histone contributing to chromatin compaction and transcriptional regulation .
*Hapln2 (*Hyaluronan and proteoglycan link protein 2*)*	Enables hyaluronic acid binding activity. Acts upstream of or within establishment of blood-nerve barrier and extracellular matrix assembly .
Hapln3 (Hyaluronan and proteoglycan link protein 3)	Enables hyaluronic acid binding activity and involves in central nervous system development

	and skeletal system development .
Hnf1b (HNF1 homeobox B)	Enables DNA-binding transcription factor activity, RNA polymerase II-specific, identical protein binding activity and promoter-specific chromatin binding activity. Acts upstream of or within several processes, including negative regulation of mesenchymal cell apoptotic process; regulation of transcription by RNA polymerase II; and tube morphogenesis .
Hrk (Harakiri, BCL2 interacting protein (contains only BH3 domain))	Involves in cellular response to potassium ion starvation; positive regulation of cellular component organization, and positive regulation of neuron apoptotic process .
Hs3st5 (Heparan-sulfate 3-O-sulfotransferase 5)	Enables [heparan sulfate]-glucosamine 3-sulfotransferase activity and involves in several processes, including heparan sulfate proteoglycan biosynthetic process; protein sulfation; and regulation of viral entry into host cell .
Id4 (Inhibitor of DNA-binding 4)	Enables RNA polymerase II-specific DNA-binding transcription factor binding activity. Involved in circadian rhythm. Acts upstream of or within several processes, including gland morphogenesis, negative regulation of cell differentiation and nervous system development .
Ido2 (Indoleamine 2,3-dioxygenase 2)	Enables indoleamine 2,3-dioxygenase activity.

	Acts upstream of or within L-tryptophan catabolic process to kynurenine .
Krt9 (Keratin 9)	Enables structural molecule activity and involves in spermatogenesis .
L1cam (L1 cell-adhesion molecule)	Enables identical protein binding activity; integrin binding activity; and sialic acid binding activity. Involved in maintenance of synapse structure and regulation of synapse assembly .
Lsmem2 (Leucine-rich single-pass membrane protein 2)	Leucine-rich single-pass membrane protein regulating skeletal-muscle excitation–contraction coupling .
Lsp1 (Lymphocyte-specific protein 1)	Enables actin binding activity. Acts upstream of or within cellular response to interleukin-7, chemotaxis and defense response .
*Mst1r (*Macrophage stimulating 1 receptor (c-met-related tyrosine kinase)*)*	MST1R itself mainly transmits survival-promoting signal, can effectively inhibit the apoptosis process and promote cell survival .
Myo5b (Myosin VB)	Myosin-Vb delivers occludin/claudin-1 vesicles to plasma membrane; loss causes microvillus inclusion disease with leaky gut and enterocyte death .
Nppb (Natriuretic peptide B)	This gene encodes a secreted protein that belongs to the family of natriuretic peptides. Its precursor protein is processed to generate the active mature peptide .
Ooep (Oocyte-expressed protein (also called Padi6-interacting protein))	Enables RNA binding activity. Involved in several processes, including cytoskeleton

	organization, positive regulation of double-strand break repair via homologous recombination and positive regulation of meiotic nuclear division .
Pabpc1l (Poly(A)-binding protein cytoplasmic 1-like)	Enables mRNA 3'-UTR binding activity, poly(A) binding activity and poly(U) RNA binding activity .
Papolb (Poly(A) polymerase-like β)	Enables poly(A) RNA polymerase activity and involves in RNA 3'-end processing and mRNA processing .
Pappa2 (Pregnancy-associated plasma protein-A2)	Enables metalloendopeptidase activity and acts upstream of or within bone morphogenesis .
Pnliprp2 (Pancreatic lipase-related protein 2)	Enables triacylglycerol lipase activity and acts upstream of or within cellular defense response; intestinal lipid catabolic process; and response to bacterium .
Prex2 (Phosphatidylinositol-3,4,5-trisphosphate-dependent Rac exchanger 2)	Enables GTPase activator activity, guanyl-nucleotide exchange factor activity and protein serine/threonine kinase inhibitor activity. Acts upstream of or within adult locomotory behavior, dendrite morphogenesis and phosphatidylinositol 3-kinase/protein kinase B signal transduction .
Psca (Prostate stem-cell antigen)	Prostate stem-cell antigen (GPI-anchored) regulating basal-cell proliferation and bladder-cancer risk. A GPI-anchored surface glycoprotein that contributes to epithelial barrier integrity .

Slc13a2 (Solute carrier family 13 member 2 (Na^+/sulfate cotransporter))	Enables sodium:dicarboxylate symporter activity and succinate transmembrane transporter activity. Involved in succinate transmembrane transport .
Traf1 (TNF-receptor-associated factor 1)	TNF-receptor-associated factor that transduces non-canonical NF-κB and cell-survival signals .
Ugt1a7c (UDP-glucuronosyltransferase 1 family polypeptide A7C)	Enables several functions, including monocarboxylic acid binding activity, protein dimerization activity and protein kinase C binding activity. Involves in coumarin catabolic process, estrogen catabolic process and liver development .
Wnt10a (Wnt family member 10A)	Wnt ligand essential for tooth, hair-follicle and hematopoietic-stem-cell self-renewal .

* Function of genes can find from National Center for Biotechnology Information (https://www.ncbi.nlm.nih.gov) (accessed on 12 Dec. 2025)