**Table S3. Known functions of 15 hub genes.**

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| Gene | Known function |
| DCN | a member of the small leucine-rich proteoglycan family of proteins;Collagen fibril assembly;Tumor suppression. |
| SERPINF1 | a member of the serpin family; Inhibiting angiogenesis; Neurotrophic factor in neuronal differentiation in retinoblastoma cells.  |
| ITGBL1 | Encoding a β integrin-related protein from EGF-like protein family; The encoded protein contains integrin-like cysteine-rich repeats.  |
| MEDAG | Positive regulation of fat cell differentiation.  |
| GPX8 | Peroxidase activity;Cellular response to oxidative stress;Located in endoplasmic reticulum lumen.  |
| TROAP | Cell adhesion;Located in cytoplasm. |
| MT3 | A member of the metallothionein family, induced under hypoxic conditions ；Important in zinc and copper homeostasis；The encoded protein is a growth inhibitory factor；Reduced levels of the protein are observed in the brains of individuals with some metal-linked neurodegenerative disorders. |
| CTSS | The preproprotein(a member of the peptidase C1 family)：the degradation of antigenic proteins to peptides for presentation on MHC class II molecules;The mature protein：the formation of antigen-MHC class II complexes;the proper display of extracellular antigenic peptides by MHC-II; remodel components of the extracellular matrix such as elastin, collagen, and fibronectin;Implicated in the pathology of many inflammatory and autoimmune diseases. |
| TLR8 | A member of the Toll-like receptor (TLR) family(plays a fundamental role in pathogen recognition and activation of innate immunity).  |
| SOX15 | A member of the SOX (SRY-related HMG-box) family of transcription factors;The regulation of embryonic develop ment;The determination of the cell fate.  |
| YIF1B | Endoplasmic reticulum to Golgi vesicle-mediated transport;Protein targeting to membrane; and sperm axoneme assembly;Located in Golgi apparatus;Endoplasmic reticulum; |
| LAPTM5 | Encoding a transmembrane receptor that is associated with lysosomes;The encoded protein may play a role in hematopoiesis |
| SOX1 | Encoding a member of the SOX (SRY-related HMG-box) family of transcription factors;The regulation of embryonic development and in the determination of the cell fate;Transcriptional activator after forming a protein complex with other proteins.  |
| FERMT3 | Protein-protein interactions involved in integrin activation;Cell adhesion, migration, differentiation, and proliferation.  |
| NCF4 | A cytosolic regulatory component of the superoxide-producing phagocyte NADPH-oxidase; |