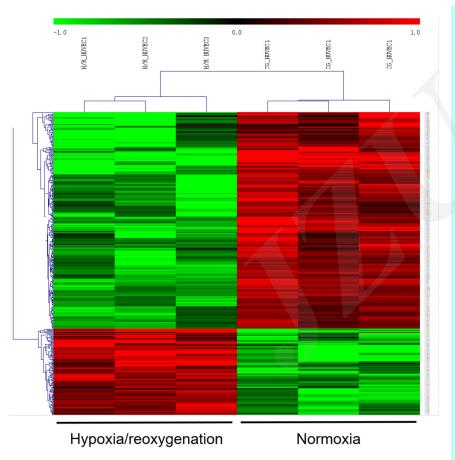
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Comparative transcriptomic analysis of vascular endothelial cells after hypoxia/reoxygenation induction based on microarray technology

Key words: Human umbilical vein endothelial cells, Hypoxia, Reoxygenation, Microarray, Pleckstrin homology like domain family A member 1, Long non-coding RNA

Research Summary

This study aimed to explore the underlying mechanisms of vascular endothelial cells (VEC) response to hypoxia/re-oxygenation by using a well-established microarray chip consisting of 58,339 probes. Totally, 372 differentially expressed genes were identified, and we summarized the key roles they played in the following aspects:

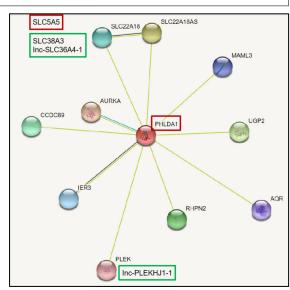


- production of oxygen free radicals
- calcium overload
- > inflammation
- glucose and lipid metabolism
- endothelial cell proliferation
- > differentiation
- > cytoskeleton regulation
- permeability
- > cell lysis
- apoptosis
- > angiogenesis

Innovation points

- Introduction the reliability and repeatability of microarray-based HUVEC hypoxia/re-oxygenation induced transcriptome profiling.
- Summary of the pathways and functions mapping with hypoxia/re-oxygenation sensitive 372 differentially expressed genes.
- CHEMOKINE SIGNALING PATHWAY

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- Emphasis of the newly identified hypoxia/reoxygenation related gene PHLDA1, and validate its expression by among CBX family members in various of cell types.
- Reveal some potential hypoxia/re-oxygenation mechanisms related to long non-coding RNAs (IncRNAs). STRING analysis found Lnc-SLC36A4-1 and Lnc-PLEKHJ1-1 may have protein-protein interactions with PHLDA1.



Innovation points

A series of comprehensive tables were generated to summarize the hypoxia/re-oxygenation induced VEC transcriptome profiling.

- Table 1 The 30 most highly up-regulated genes with Entrez Gene ID of HUVEC induced by hypoxia/re-oxygenation.
- Table 2 The 30 most highly down-regulated genes with Entrez Gene ID of HUVEC induced by hypoxia/re-oxygenation.
- Table 3 Pathways and functions associated with hypoxia/re-oxygenation analyzed by GO.
- Supplementary Table 1 | The full list of microarray-based HUVEC hypoxia/re-oxygenation induced differentially regulated gene probes.