Online Data Supplement

Lung Gene Expression Analysis (LGEA) Web Portal v3: Lung at a Glance

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Appendix 1

LGEA web portal feature panels and tools
(https://research.cchmc.org/pbge/lunggens/mainportal.html)

LGEA functional panels and tools	Description	Link
LungGENS	**LungGENS** (Lung Gene Expression iN Single-cell) provides query functions of lung single cell data. **LungGENS** provides two distinct query functions: "Query by gene" and "Query by cell type".	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungSortedCells	**LungSortedCells** provides analyzed gene expression patterns obtained from sorted cell populations from human and mouse lung.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungDTC	**LungDTC** (Lung Developmental Time Course) provides query functions of lung developmental time course data.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungDisease	**LungDisease** provides query functions of lung single cell, sorted cell data, lung images from various lung diseases.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungEpigenetics	**LungEpigenetics** displays lung epigenetic data from ENCODE in UCSC genome browser	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungImage	**LungImage** hosts a image collection consisting of >3000 images from immunofluorescence confocal microscopies, H&E staining, thick tissue PLISH and Second harmonic obtained from mouse/human development and disease lung samples.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungProteomics	**LungProteomics** provides protein-centered query functions for users to query a protein of interest or protein signatures of a given cell type.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LGEA-Toolbox	**LGEA-ToolBox** provides several web tools we developed for investigators to compare and integrate their own gene list of interest with LGEA datasets; for advanced users, we provide R-scripts for our single cell analytic pipelines. We also provide links to commonly used analytic tools from external resources.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LGEA-ProjectBased	**LGEA-ProjectBased** collected lung single cell data from our recent publications and other laboratories interested in having their data hosted on the LGEA web site.	https://research.cchmc.org/pbge/lunggens/mainportal.html
LungOntology	**LungOntology** is the latest released feature of LGEA embedded in the "**Lung at a glance**" toolset which bridges lung anatomic ontologies to lung image collection and lung gene expression in LGEA web portal.	https://research.cchmc.org/pbge/lunggens/mainportal.html

LDProfiles	Lung Developmental Gene Expression Profiles (**LDProfiles**) provides gene query function using mouse lung developmental time course microarray data cross different mouse strains.	https://research.cchmc.org/pbge/ldprofiles.html
Signatures comparison	**Signatures comparison** allows users to compare gene list against signatures genes, transcription factors, and surface markers in LGEA datasets.	https://research.cchmc.org/pbge/lunggens/tools/sigcomp.html
Gene list query	**Gene list query** allows users to type in or paste their own gene list of interest to explore the expression patterns of these genes across different cell types in LGEA database.	https://research.cchmc.org/pbge/lunggens/tools/gene_list_query.html
Gene Expression Dot Plot	**Gene Expression Dot Plot** allows users to analyze their own gene list of interest against any given dataset in LGEA. A dot plot will be generated to display the expression patterns of these genes cross different cell types and different lung development stages.	https://research.cchmc.org/pbge/lunggens/tools/data_retrieval.html
Lung at a glance	**Lung at a glance** is our newly developed toolset consisting three distinct but interactive components: 1) "Region at a glance", 2) "Cell at a glance" and 3) "Gene at a glance".	https://research.cchmc.org/pbge/lunggens/tools/lung_at_glance.html
SINCERA	A Computational Pipeline for Single Cell RNA-seq Profiling Analysis.	https://research.cchmc.org/pbge/sincera.html
SLICE	The **SLICE** (Single Cell Lineage Inference Using Cell Expression Similarity and Entropy): determining Cell Differentiation and Lineage based on Single Cell Entropy.	https://research.cchmc.org/pbge/slice.html
Other research tools list	We collect and provide links to commonly used analytic tools from external resources.	https://research.cchmc.org/pbge/lunggens/tools/toolsList.html

Appendix 2

LGEA web portal tutorial list

(https://research.cchmc.org/pbge/lunggens/mainportal.html)

Name	Description	Link
Introduction of LungMAP -- Dr. Jeffrey Whitsett	LungMAP project introduction	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
Introduction of LGEA Web Portal -- Dr. Yan Xu	ATS Webinar Seires 2019 (http://54.209.11.195/members/assemblies/sectio ns/gg/journal-club/lungmap-part-1.php). LGEA web portal introduction and usage of LGEA resouces.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- User Case 1 (Functional feature of Gene list query)	Users will explore the functional feature of "Gene list query" in LGEA toolbox using a set of genes from an analysis result to identify cell types that selectively express in our input gene list.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- User Case 2 (Functional feature of Cell at a glance)	Users want to compare gene sets in alveolar epithelial cells along with immunofluorescence images during lung development (E16.5 –PN28). In this user case. users will explore AT2 cells using our "Cell-at-a-glance" tool to find all the information related to AT2 cells including immunofluorescence images.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- User Case 3 (Functional feature of "Region at a glance")	Users will explore the functional feature of "region-at-a-glance" to help users explore the region of interest and the cells within the region.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- User Case 4 (Functional feature of "Cell at a glance" and "Gene at a glance")	Users will explore the functional feature of the "Cell-at-a-glance" and "Gene-at-a-glance" to help users identify markers and images for endothelial cells during lung development.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- User Case 5 (Functional feature of "Signatures comparison")	Users will explore the functional feature of "Signatures Comparison" in LGEA toolbox. Users can compare their gene list to cell type specific signatures in LGEA database, compare two gene lists from LGEA signatures database, and find transcription factors or surface markers in their gene list.	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html
LGEA tutorial -- Lung Image website	Functional feature of Lung Image website	https://research.cchmc.org/ pbge/lunggens/LGEA_help. html

LGEA tutorial -- Nikon Brightfield Microscope H&E Imaging	Settings for Nikon Brightfield Microscope and Tile Scanning H&E Staining Human Lung.	https://research.cchmc.org/pbge/lunggens/LGEA_help.html