CCF Workshop Kidney (BUKMAP)

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HuBMAP U54 KULMAP Team – Thank You

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Project overview

Hagood/Sun @UCSD

LAPMAP

Zhang@UCSD

DART-FISH

Tissue blocks

Jain@WashU

Nuclei

BUKMAP

snDrop-Seq

SNAPE-Seq

scTHS-Seq

Kharchenko@HMS

Atlases

Organ spatial maps
- All cell types;
- Spatial distribution;
- Reference transcriptome;
- Reference chromatin accessibility map;
- Selected proteins
Overview

• Challenges in using common coordinates in kidney
• Approach to minimize challenges
• Glimpse of the workflow for BUKMAP
Variations in Kidney Vasculature: Intrinsic and Extrinsic Factors


Proposal for a Simple Anatomical Classification of the Pelvicaliceal System for Endoscopic Surgery
Ryoji Takazawa, MD, PhD, Sachi Kitayama, MD, Yusuke Uchida, MD, Satoshi Yoshida, MD, Yusuke Kohno, MD, and Toshihiko Tsujii, MD, PhD, J of Endourology, 2018

Variations in Kidney Pelvicaliceal System: Intrinsic and Extrinsic Factors

Fig. 8. Diagrammatic representations of typical normal variations of the calyces of the middle lobe of the left kidney.

Fig. 9. Drawings showing influence of the spleen upon the renal pelvis.

Fig. 10. Normal variation of the upper, middle and lower lobe calyces.

Fig. 11. Schematic drawing showing bulging of lateral contour of a lobulated left kidney.
Quality Control and Standardization = effective CCF

Subject
- Pre-analytical parameters (metadata – clinical, procurement, storage, shipping)

Tissue (Nx or Donor)
- Histology-authentication
- Processing pipeline (viability, integrity of sections, yield cutoffs, RNA QC)

OMICS/IMAGE
- Cell types (markers)
- Reproducibility
- Validation
- Instruments
- Filtering cutoffs

HIVE
- Data deposition
- Integrative analysis
- Software harmonization
- Ontologies
- Visualization
Gross Registration Using polar lines

The R.E.N.A.L. Nephrometry Score: A Comprehensive Standardized System for Quantitating Renal Tumor Size, Location and Depth
C-M1 3.8cm from the posterior

Depth 4.5cm.
Workflow

Gross reference

Histological reference

Chromatin accessibility (scTHS-Seq)

Single nucleus RNA seq (SPLIT-Seq)

3D RNA spatial mapping (DART-FISH)

Cell type/state reference

Structure/region reference
Structure - microscopic

Cortex

Medulla

Ureter

C M J

Cortex

Medulla

C M J

outer inner

urothelium

lumen
snDrop-Seq: Clustering and Initial Annotation

Standardize segment names, cell types, markers
Harmonize – VUMC and BUKMAP

Metadata (many levels)
- Anatomical coordinates
- Structures
- Regions
- Cell types
- Markers

There has been significant progress, but some more challenges