

Retrieval-Augmented Generation (RAG)

Prompt

Question:

Chronic urethral obstruction due to benign prismatic hyperplasia can lead to the following change in kidney parenchyma ?

Options:

A. Hyperplasia B. Hyperophy C. Atrophy D. Dyplasia

Step1: Retrieve K documents



(1) This study used a prospective cohort design. A total of 198,399 male patients without CKD at baseline were recruited from the UK Biobank from 2006 to 2010..... (Not relevant)

(2).....Obstructive uropathy causes urine to back up and injure the kidneys, leading to hydronephrosis and eventually shrinkage of kidney tissue..... (Relevant)

(3) Cox proportional hazards models were used to analyze the relationships between BPH, its medication, and the incidence of CKD and end-stage kidney disease (ESKD)..... (Not relevant)

Step2: Prompt LLM with K docs and generate

Prompt

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Documents:

(1) This study used a prospective cohort design...

(2) ...Obstructive uropathy causes urine to back up and injure the kidneys...

(3) Cox proportional hazards models were used to analyze the relationships between BPH,...



Answer: A. Hyperplasia (Wrong Answer)

Context too long !
key info in doc (2) missed

Ours: Context Knowledge Graph Retrieval-Augmented Generation (CKG-RAG)

Prompt

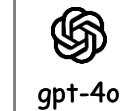
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Step1: Medical Entity Extraction



Extracted medical entities:

[Chronic urethral obstruction; benign prismatic hyperplasia; kidney parenchyma; Hyperplasia; Atrophy; Dyplasia]

Step2: Retrieval from Multi-Source Knowledge Bases

Retrieved Knowledge

(1) Knowledge from Prime-KG
(Chronic urethral obstruction, causes, Kidney damage); (Hyperplasia, type_of, Cell proliferation)

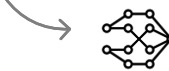
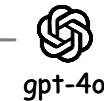
(2) Knowledge from Textbook
In cases of chronic urethral obstruction, prolonged blockage causes urine to back up, resulting in

(3) Knowledge from UMLS
Chronic urethral obstruction:
Persistent blockage in the urethra that blocks urine flow

Step3: Contextual Knowledge Graph Construction

Extracted triples:

(Kidney parenchyma, part_of, Kidney);
(Atrophy, characterized_by, Tissue shrinkage).....



Contextual Knowledge Graph

Step4: Generation with Graph-structured Soft Prompt

