

# Solid Tumour Section

## Short Communication

# Kidney: Succinate dehydrogenase-deficient renal cell carcinoma

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## Abstract

Short communication on succinate dehydrogenase-deficient renal cell carcinoma.

### Keywords

Kidney; Renal cell carcinoma

## Identity

### Other names

Kidney; SDH-deficient renal cell carcinoma

## Clinics and pathology

### Epidemiology

Succinate dehydrogenase-deficient renal cell carcinoma represents between 0.05 and 0.2% of all renal cell carcinoma (RCCs) and is found in young adults. Mean patient age at presentation was 37 years (range, 14 to 76 y), with a slight male predominance (M:F=1.7:1).

### Clinics

Bilateral tumors were observed in 26% of patients. Patients with germ line mutations in succinate dehydrogenase deficient (SDH) subunit genes (SDHA ,B,C and D) are highly sensitive to certain types of neoplasms such as paragangliomas, pheochromocytomas, gastrointestinal stromal tumors and renal cell carcinomas (Gill AJ .2012).

### Pathology

Tumors have a tan to light brown well circumscribed cut surface. SDH-deficient RCC cells are comprised of a monomorphic population

of eosinophilic, typically low grade tumor cells that have a bubbly appearance due to the presence of cytoplasmic vacuoles (abnormal mitochondria secondary to the SDH mutation); the latter may be lost in higher-grade transformed tumors.

**Immunohistochemistry** All cases with the typical morphology demonstrated negative staining for SDHB.

The presence of negative staining for SDHB almost always signifies germline mutation of one of the components of the mitochondrial complex 2 (SDHA, SDHB, SDHC, SDHD, SDHAF2)

### Prognosis

Sarcomatoid changes and necrosis are rare but are associated with poorer outcomes.

## Genetics

### Two hit process

The two hit process (germ line mutations and loss of the wild-type allele) is involved in the development of SDHB-deficient renal cell carcinoma (Schmidt and Linehan 2016).

The risk of renal tumors seems highest for SDHB mutation.

The germ line mutations reported were extensively found in exons coding the mitochondrial targeting sequence or 2FE-2S ferredoxin-type iron-sulfur binding domain.

**Next-generation sequencing data** Additionally, a targeted next-generation sequencing panel did not reveal alterations in other key genes involved in RCC pathogenesis, such as VHL, PIK3CA, AKT, MTOR, MET, or TP53 (Williamson et al. 2015).

## Genes involved and proteins

**Succinate dehydrogenase (SDH) genes; SDHA, SDHB, SDHC, SDHD, SDHAF2.**

Succinate dehydrogenase (SDH) is a key respiratory enzyme complex that converts succinate to fumarate in the citric acid cycle (CAC) and also functions in the mitochondrial electron transport chain.

It comprises 4 subunits, SDHA, SDHB, SDHC, and SDHD

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