SMARCA4 gene

Associated Syndrome Name: Rhabdoid tumor predisposition syndrome (RTPS)

SMARCA4 Summary Cancer Risk Table

CANCER	GENETIC CANCER RISK
Ovarian	High Risk
Other	Elevated Risk

SMARCA4 gene Overview

Rhabdoid tumor predisposition syndrome (RTPS) [1, 2, 3, 4]

- Individuals with *SMARCA4* mutations have rhabdoid tumor predisposition syndrome (RTPS).
- Individuals with RTPS have an increased risk for rhabdoid tumors, which are aggressive soft tissue tumors. The highest risk for these tumors is under the age of 3, and the exact size of this risk is unknown but likely low.
- Based on reported cases, there is evidence that females with *SMARCA4* mutations have a significantly increased risk for small cell carcinoma of the ovary, hypercalcemic type (SCCOHT). SCCOHT is a rare and aggressive ovarian cancer that typically occurs at younger ages, with a median age of onset of 24 years. The exact size of this risk is unknown.
- Some mutations in *SMARCA4* cause Coffin-Siris syndrome, which is associated with congenital anomalies, development delay, hearing impairment, and eye abnormalities, and is typically diagnosed in infancy. It is unknown whether the *SMARCA4* mutation identified in this individual may also cause Coffin-Siris syndrome, in addition to an increased risk for cancer.
- Although there are increased cancer risks for individuals with RTPS, there may be interventions that can reduce these risks. Guidelines from the American Association for Cancer Research (AACR) and suggestions from experts who study the condition are provided below. Since information about the cancer risks associated with *SMARCA4* mutations is relatively new, and there is uncertainty about the best ways to reduce these risks, it may be appropriate to interpret these results in consultation with cancer genetics professionals who have expertise in this emerging area of knowledge.

SMARCA4 gene Cancer Risk Table

CANCER TYPE	AGE RANGE	CANCER RISK	RISK FOR GENERAL POPULATION
Ovarian	To age 80[2, 5]	High risk	0.9%
Rhabdoid Tumors	To age 80[2]	Elevated risk	<0.1%

SMARCA4 Cancer Risk Management Table

The overview of medical management options provided is a summary of professional society guidelines. The most recent version of each guideline should be consulted for more detailed and up-to-date information before developing a treatment plan for a particular patient.

This overview is provided for informational purposes only and does not constitute a recommendation. While the medical society guidelines summarized herein provide important and useful information, medical management decisions for any particular patient should be made in consultation between that patient and his or her healthcare provider and may differ from society guidelines based on a complete understanding of the patient's personal medical history, surgeries and other treatments.

CANCER TYPE	PROCEDURE	AGE TO BEGIN	FREQUENCY (UNLESS OTHERWISE INDICATED BY FINDINGS)
Ovarian	Currently there are no specific medical management guidelines for ovarian cancer risk in mutation carriers. However, the increased risk may warrant consideration of individualized screening with abdominal ultrasounds every 6 months, and preventive oophorectomy may be justified outside of the pediatric age range.[2]	NA	NA

CANCER TYPE	PROCEDURE	AGE TO BEGIN	FREQUENCY (UNLESS OTHERWISE INDICATED BY FINDINGS)
Rhabdoid Tumors	Whole-body MRI[4]	At time of diagnosis of RTPS	Annually, until at least age 5
	Brain and spine MRI[4]	At birth	Every 4 to 6 weeks until age 6 months, every 2 to 3 months until age 5, every 2 to 3 years until at least age 10

Information for Family Members

The following information for Family Members will appear as part of the MMT for a patient found to have a mutation in the SMARCA4 gene.

This patient's relatives are at risk for carrying the same mutation(s) and associated cancer risks as this patient. Cancer risks for females and males who have this/these mutation(s) are provided below.

Family members should talk to a healthcare provider about genetic testing. Close relatives such as parents, children, brothers and sisters have the highest chance of having the same mutation(s) as this patient. Other more distant relatives such as cousins, aunts, uncles, and grandparents also have a chance of carrying the same mutation(s). Testing of at-risk relatives can identify those family members with the same mutation(s) who may benefit from surveillance and early intervention.

Consultation with a cancer genetics professional to discuss the risks and benefits of genetic testing for children at risk of inheriting a *SMARCA4* mutation may be appropriate.

References

1. Nemes K, et al. Rhabdoid Tumor Predisposition Syndrome. 2022 May 12. In: Adam MP, et al., editors. GeneReviews® [Internet]. PMID: 29215836.
2. Foulkes WD, et al. Cancer Surveillance in Gorlin Syndrome and Rhabdoid Tumor Predisposition Syndrome. Clin Cancer Res. 2017 Jun 15;23(12):e62-e67. PMID: 28620006.
3. Schrier Vergano S, et al. Coffin-Siris Syndrome. 2025 May 15. In: Adam MP, et al., editors. GeneReviews® [Internet]. PMID: 23556151.
4. Greer MC, et al. Update on Whole-Body MRI Surveillance for Pediatric Cancer Predisposition Syndromes. Clin Cancer Res. 2024 Nov 15;30(22):5021-5033. PMID: 39287924.
5. SEER*Explorer: An interactive website for SEER cancer statistics [Internet]. Surveillance Research Program, National Cancer Institute. [Cited 2025 Aug 12]. Available from https://seer.cancer.gov/explorer/.

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