Cribriform Neuroepithelial Tumor (CRINET): A SMARCB1-deficient non-rhabdoid tumor sharing molecular similarities with the ATRT-TYR subgroup but showing favorable outcome

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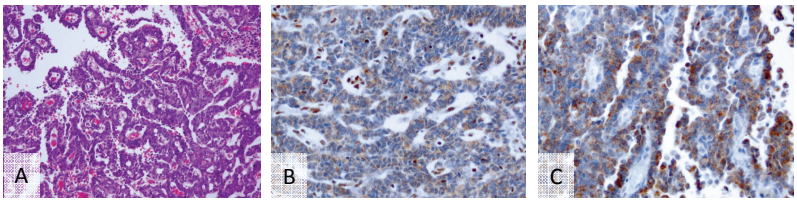
Background

Rare non-rhabdoid brain tumors showing cribriform growth pattern and SMARCB1 loss have been designated cribriform neuroepithelial tumor (CRINET). It remains uncertain whether CRINET represents a distinct entity or a variant of atypical teratoid/rhabdoid tumor (ATRT).

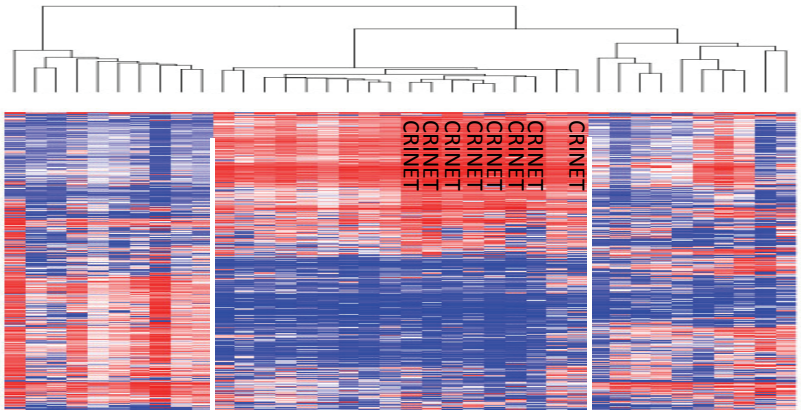
Methods

Ten CRINETs were clinically and molecularly characterized and compared with 10 ATRTs of each of three molecular subgroups (i.e. ATRT-TYR, ATRT-SHH and ATRT-MYC) using Illumina Infinium HumanMethylation 450 arrays, FISH, MLPA, and sequencing. Furthermore, outcome was compared to a larger cohort of 27 children with ATRT-TYR.

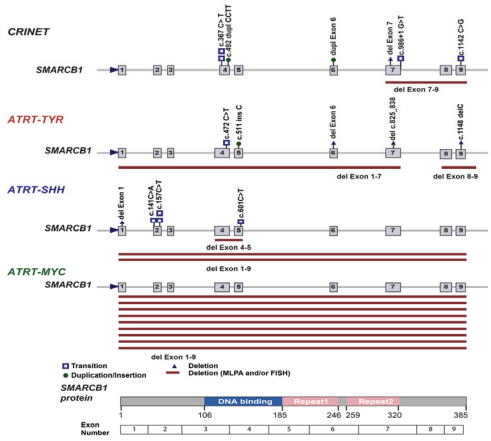
Results



Histopathology of CRINET.
H&E staining (A), immuno-histochemistry for SMARCB1 (B) and tyrosinase (C). Note loss of nuclear SMARCB1 staining as well as staining for tyrosinase.

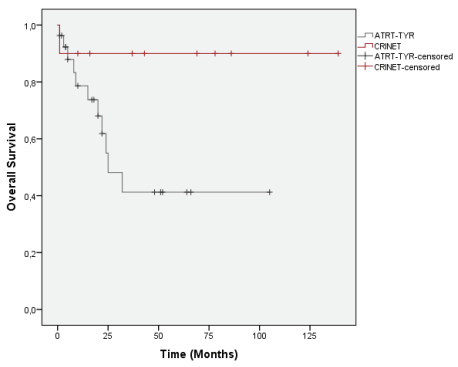


Molecular profiling of CRINET vs. ATRT.
Heatmap showing unsupervised clustering of methylation profiles of 38 samples using the 5,000 most variable probes. Note that all eight CRINETs examined cluster within the ATRT-TYR subgroup.



Spectrum of *SMARCB1* mutations in CRINET vs. ATRT.
Note similar distribution of mutations across the *SMARCB1* gene in CRINET and ATRT-TYR.

Long-term Outcome of CRINET vs. ATRT-TYR.
Kaplan Meier analysis of overall survival data of 10 patients with CRINET as compared to 27 patients harboring ATRT-TYR (P<0.05 Log rank test).



Conclusion

CRINET represents a SMARCB1-deficient non-rhabdoid tumor, which shares molecular similarities with the ATRT-TYR subgroup but has distinct histopathological features and favorable long-term outcome.