

# Defining FOXR1 expression and function in cancer

Michelle Johnston, PharmD Candidate 2023

## Background

FOXR1 is a protein coding gene that encodes a member forkhead box (FOX) family of transcription factors. FOX family members are monomeric, helix-turn-helix proteins with a core DNA-binding domain of approximately 110 aa. Many FOX transcription factors play roles in determining cell fates during early development. This forkhead box protein lacks the C-terminal basic region found in many other FOX family members. Diseases associated with FOXR1 include CNS Neuroblastoma with FOXR2 activation and CNS neuroblastoma.<sup>1</sup>

## Project Aim

1. Determine the genetic, pathological, and clinical features of FOXR1 expressing TETs.
2. Determine the mechanism that activates aberrant FOXR1 expression.

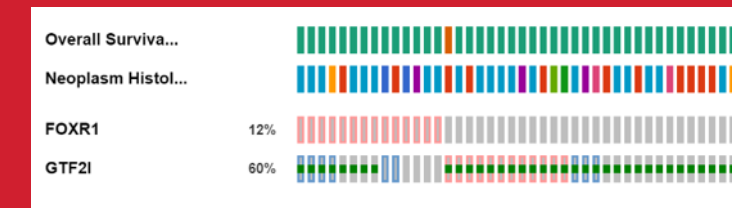


Figure 2. – Marked prevalence of a thymoma-specific mutated oncogene, GTF2I. This is most likely founder mutations occurring at the onset or very early in tumor development.<sup>2</sup>

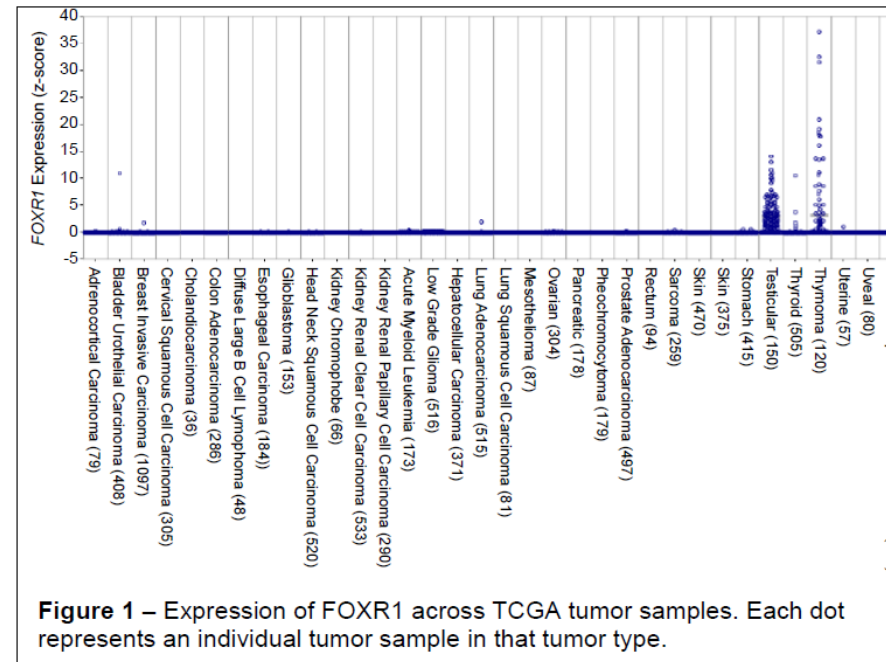


Figure 1 – Expression of FOXR1 across TCGA tumor samples. Each dot represents an individual tumor sample in that tumor type.

In preliminary studies, a survey of 9,607 human tumor samples across 34 different tumor types (TCGA database), found that FOXR1 expression is aberrantly expressed in a subset of cancers, and its expression is enriched for in thymic epithelial tumors (Figure 1).

**Michelle Johnston,**  
University of Cincinnati  
PharmD Candidate 2023  
johnstm9@mail.uc.edu



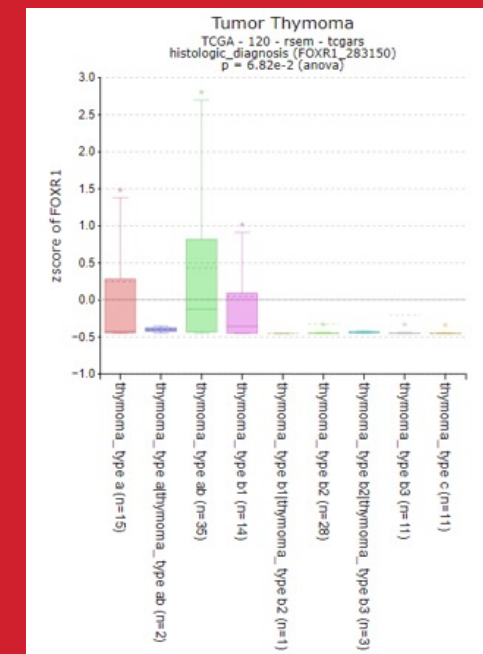
## High FOXR1 mRNA Histology Types



■ B1 ■ B3 ■ AB ■ A ■ B2

A	4	19%
AB	13	62%
B1	2	10%
B2	1	5%
B3	1	5%

FOXR1 is most commonly expressed in thymoma tumors in the histologic types A, AB, and B1,B2, and B3.<sup>2</sup>



## References

1. Database, GeneCards Human Gene. "FOXR1." <https://www.genecards.org/cgi-bin/carddisp.pl?gene=FOXR1>.
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