

# FOX protein

FOX (Forkhead box) proteins are a family of [transcription factors](#) that play important roles in regulating the expression of genes involved in cell growth, proliferation, differentiation, and longevity. Many FOX proteins are important to embryonic development.

FOX proteins also have pioneering transcription activity by being able to bind condensed chromatin during cell differentiation processes.

The defining feature of FOX proteins is the forkhead box, a sequence of 80 to 100 amino acids forming a motif that binds to DNA. This forkhead motif is also known as the winged helix due to the butterfly-like appearance of the loops in the protein structure of the domain.

Forkhead proteins are a subgroup of the helix-turn-helix class of proteins.

Many genes encoding FOX proteins have been identified. For example, the FOXF2 gene encodes forkhead box F2, one of many human homologues of the *Drosophila melanogaster* transcription factor forkhead. FOXF2 is expressed in lung and placenta.

Some FOX genes are downstream targets of the hedgehog signaling pathway, which plays a role in the development of basal cell carcinomas. Members of the class O regulate metabolism, cellular proliferation, stress tolerance and possibly lifespan. The activity of FoxO is controlled by post-translational modifications, including phosphorylation, acetylation and ubiquitination.

The founding member and namesake of the FOX family is the fork head transcription factor in *Drosophila*, discovered by Detlef Weigel and Herbert Jäckle. Since then a large number of family members have been discovered, especially in vertebrates. Originally they were given vastly different names (such as HFH, FREAC, and fkh), but in 2000 a unified nomenclature was introduced that grouped the FOX proteins into subclasses (FOXA-FOXS) based on sequence conservation.

see [FOXO1](#).

see [FOXO4](#).

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Last update: **2024/06/07 02:48**

