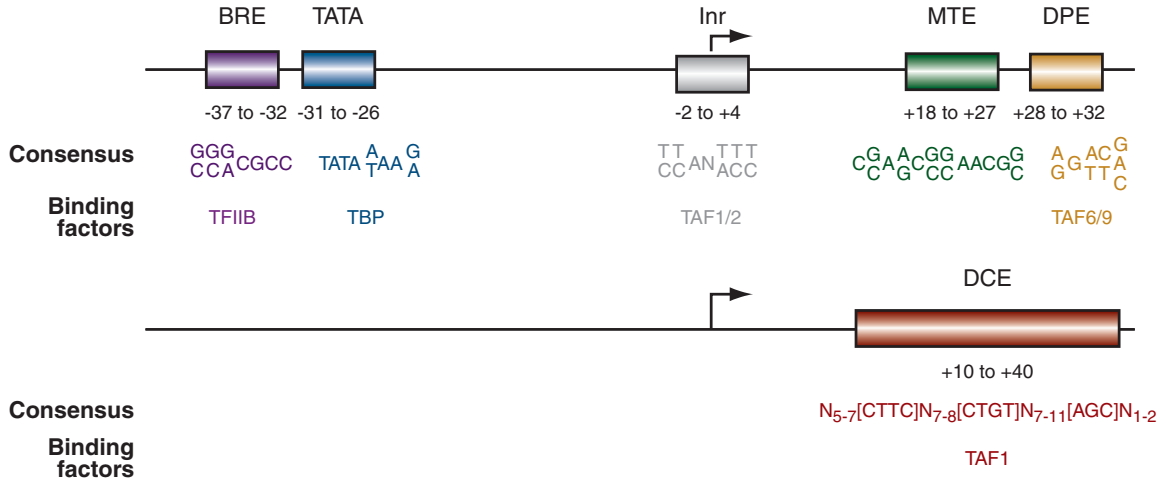

Figure 3

Core promoter elements. Metazoan core promoters are composed of a number of elements that may include a TATA box, an Initiator element (Inr), a Downstream Promoter Element (DPE), a Downstream Core Element (DCE), a TFIIB-Recognition Element (BRE), and a Motif Ten Element (MTE). The human consensus sequence of these elements, their relative positions, and the transcription factors that bind them are shown. The DCE is shown on a separate core promoter for illustration purposes only. Although the DCE can be present in promoters containing a TATA box and/or Inr, it presumably does not occur with a DPE or MTE.

Inr: Initiator

TATA box, the binding site for the TBP subunit of TFIID. In addition to the TATA box, metazoan core promoters can be composed of numerous other elements, including: Initiator element (Inr), Downstream Promoter Element (DPE), Downstream Core Element (DCE), TFIIB-Recognition Element (BRE), and Motif Ten Element (MTE) (113) (**Figure 3**). With the exception of the BRE, which is specifically recognized by TFIIB, all other core promoter elements described to date are TFIID-interaction sites: TAF6 and TAF9 contact the DPE, TAF1 and TAF2 contact the Inr, and TAF1 contacts the DCE (100, 166).

A statistical analysis of ~10,000 predicted human promoters revealed that these known core promoter sequence motifs may not be as universal as previously thought (68). Of the four core promoter elements surveyed (TATA, Inr, DPE, and BRE), the Inr was the most common element, occurring in nearly half of all promoters. By contrast, DPE and BRE were each found in roughly one fourth of promoters, and TATA boxes were present in only one eighth of promoters. Strikingly, nearly a quarter of all promoters analyzed had none of these four elements, suggesting that either additional core promoter elements or other types of promoter features may yet be discovered. Consistent with this idea, recent reports suggest the existence of more unusual core promoter architectures, such as so-called ATG deserts (102). Moreover, it was recently reported that higher-order structural properties of promoter DNA, which are determined in part by the nucleotide sequence, can be used to identify and classify core promoters (59). Future work may uncover promoter structural properties that are important for GTF-DNA interactions. Indeed, nearly all of the GTFs contact DNA in the core promoter region (reviewed in 73). Although many of those interactions appear to be nonspecific, the efficiency of their function may be affected by structural properties of the promoter DNA, which are affected by the underlying nucleotide content.