The interaction between RNA and RNA-binding proteins (RBPs) has a key role in the regulation of gene expression, in RNA stability, and in many other biological processes. RBPs accomplish these functions by binding target RNA molecules through specific sequence and structure motifs. The identification of these binding motifs is therefore fundamental to improve our knowledge of the cellular processes and how they are regulated. Here, we present BRIO (BEAM RNA Interaction mOtifs), a new web server designed for the identification of sequence and structure RNA-binding motifs in one or more RNA molecules of interest. BRIO enables the user to scan over 2508 sequence motifs and 2296 secondary structure motifs identified in Homo sapiens and Mus musculus, in three different types of experiments (PAR-CLIP, eCLIP, HITS). The motifs are associated with the binding of 186 RBPs and 69 protein domains. The web server is freely available at http://brio.bio.uniroma2.it.