

# nBMST: the non-B DNA Motif Search Tool Tutorial (Version 1.1 - September 2011)

Below is a step-by-step instruction on how to submit one or more DNA sequences to find potential non-B DNA motifs using non-B DNA Motif Search Tool (nBMST).

1) Go to non-B DNA Motif Search Tool (nBMST) at <http://nonb.abcc.ncifcrf.gov/apps/nBMST/default/>.

**Figure 1** The graphical user interface of the Nbmst. A sequence is uploaded and all the non-B DNA motifs are selected.

non-B DNA Motif Search Tool (nBMST) Version 1.0

(1) Enter an email address (optional).  
(2) Select one or more non-B DNA motifs.  
(3) Select one of the two methods of submitting input DNA sequence(s) in FASTA format. Or use single or multiple sequence samples for testing purposes.  
(4) Enter Captcha information, if not logged in.  
(5) Click Submit.

You are not logged in. If you have registered and wish this query to be recorded for future viewing you must be logged in.  
[Register](#) | [Login](#)

For help with nBMST, visit the [Help](#) and [FAQ](#) pages.

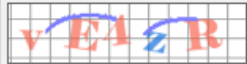
A field with an asterisk (\*) before it is a required field.

Email address:

\*Non-B DNA motif(s):  
A-Phased Repeats  
Direct Repeats and Slipped Motifs  
G-Quadruplex Forming Repeats  
Inverted Repeats and Cruciform Motifs  
Mirror Repeats and Triplex Motifs  
Z-DNA Motifs

Enter sequence(s)  Upload sequence(s)  Use the single sequence sample  Use the multi sequence sample

\*File: (Maximum file size allowed is 20 MB)  Bacillus\_ant...es\_ancestor

\*Captcha  
Type the characters seen in the image below to continue.  


2) Enter an email address. Although optional, if your input sequences are large, it is recommended that you provide us with your email address so that you may retrieve your results when you receive a notification email rather than waiting for the result.

**Tip:** Registered users who logged in do not need to enter email address.

3) Select one or more or all non-B DNA motifs.

**Tip:** *On Windows, use Ctrl or Shift key to select multiple motifs. On Mac, use Command*

4) There are the four different ways of submitting DNA sequences.

**Option 1:** In the text box for the “Enter sequence(s)” field, copy and paste one or more DNA sequences.

**Option 2:** Click on “Upload sequence(s)” and select a file containing one or more DNA sequences.

**Option 3:** Click on “Use the single sequence sample” to test a file with one DNA sequence only.

**Option 4:** Click on “Use the multi sequence sample” to test a file with more than one DNA sequence.

**Tip:** The DNA sequences:

- must be in FASTA format.
- can contain only 'A', 'C', 'G', 'T', or 'N' in either uppercase or lowercase.
- may contain spaces.
- must be no larger than 20 megabytes (MB).

***For larger data, please contact us via the contact form or email at [nonb@nih.gov](mailto:nonb@nih.gov).***

5) Enter captcha characters and hit *Submit*.

**Tip:** *Logged in users do not need to enter this information.*

*Turnaround time for results will vary depending on the size of the sequence(s) and the number and the type of non-B DNA motifs selected. In cases where input sequences are very large and/or if multiple motifs are selected, an email address is recommended to avoid waiting time as a notification email is sent when the job is completed.*

6) The nBMST result page contains in the upper section the unique *Job ID*, *Total non-B motifs found* in the sequence submitted, *Results will be stored until*, *Link* to access the result in the future if desired, *Dynamic Visualization* with a link to *PolyBrowse*, and the *Download all the files for this job* link. This is followed by lower section displaying the link to *Expand all results*, the number of motifs found in parentheses and the download link for each motif type.

**Figure 2** displays a typical result page of nBMST.

nBMST results

Job ID: 8c32923d93  
Total non-B motifs found: 6720  
Results will be stored until: 10/01/2011 11:45am  
Link: <http://nonb.abcc.ncifcrf.gov/apps/nBMST/pickup/8c32923d93>  
Dynamic Visualization: [PolyBrowse](#)

Download all files for this job

[Expand all results](#)

▼ a-phased repeats (1189 Results)	Download all files for this motif
▼ direct repeats (280 Results)	Download all files for this motif
▼ g-quadruplex forming repeats (6 Results)	Download all files for this motif
▼ inverted repeats (3945 Results)	Download all files for this motif
▼ mirror repeats (1147 Results)	Download all files for this motif
▼ z-dna motifs (29 Results)	Download all files for this motif

7) To provide better visualization of the results, both static Portable Network Graphic (PNG) images and dynamic PolyBrowse link are provided.

- **Static PNG image**

The top panel is a graphical representation of the position of the direct repeats across the submit-tered nucleotide sequence. The red arrow shows the size of the sequence submitted and the direct repeats are found across the genome.

The bottom panel contains detailed information for each motif, including the start and stop coordinates, strand, length, structure, sequence composition and a note if the sequence can also be categorized as a short tandem repeat (STR).

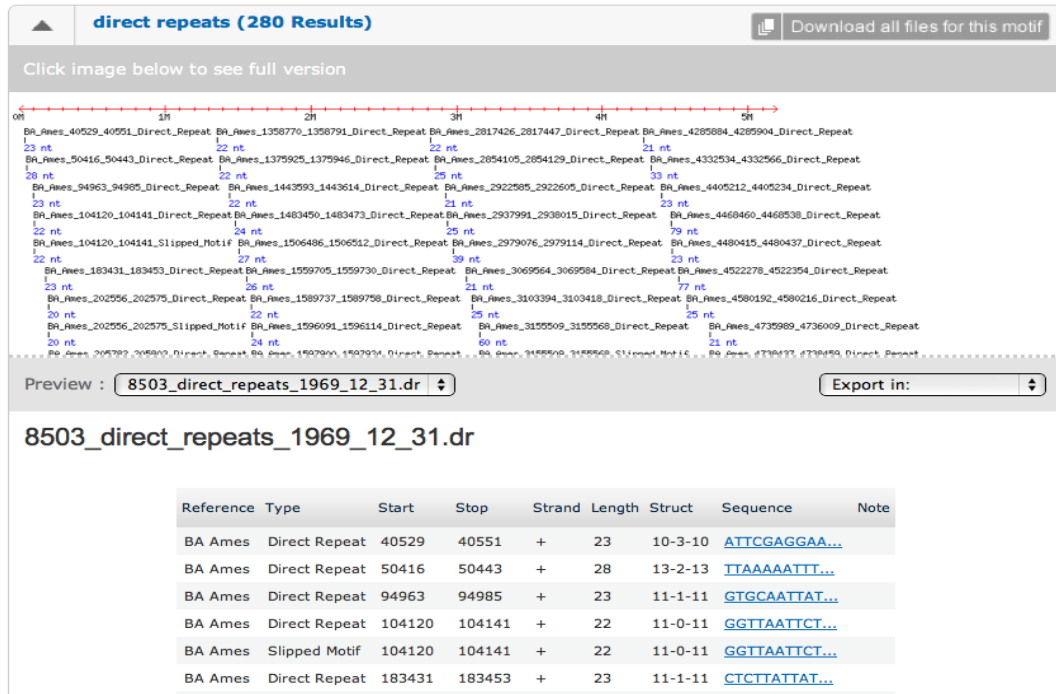
- **Dynamic PolyBrowse**

The PolyBrowse provides a way to view the non-B DNA-forming motifs interactively and is particularly useful when there are too many entries to be viewed in a static image.

8) The results can be downloaded in two ways.

- To download individual files for just one type of non-B DNA motif, click on **Download all files for this motif**. This will download GFF and tab delimited files.
- To download all the files for all the motifs you have selected, click on **Download all files for this job**. This comprehensive download includes all the GFF files, tab delimited files, and PNG images.

**Figure 3** displays static visualization of nBMST.



**Figure 4** displays dynamic visualization of nBMST.

