Tools for transcription factor research

USB® product portfolio
- Nuclear Extraction Kit
- Transcription Factor Protein/DNA Arrays
- Transcription Factor EMSA Gel-shift Assays
- Transcription Factor ELISA Kits
- Transcription Factor Reporter Vectors
- Stable Cell Lines

We have developed a comprehensive suite of tools to aid in transcription factor (TF) research. Our portfolio offers a workflow approach with transcription factor screening kits, nuclear extraction, and cell isolation kits, as well as transcription factor reporter vectors, for in vivo analysis.

Our in vitro assays for transcription factor (TF) profiling include our protein/DNA (PD) arrays that can be used to monitor TF expression levels when cells are perturbed by various stimuli or as they are subjected to a change in their physiological state. This approach can aid in the understanding of signaling pathways and can also be used to generate biomarker fingerprints or signatures. PD arrays can also be used as tools for developing cell-based assays.

The USB EMSA Gel-Shift Assays allow for confirmation of TF binding to specific regions of DNA. The assay is based on the principle that the TF:DNA complex migrates at a slower rate than the unbound DNA. This allows separation on a native gel and subsequent detection of labeled DNA (both bound and unbound). This widely published and fundamental assay is specific and requires a minimum of 5 µg of TF protein per well.

For high throughput identification of TF binding activity to DNA our transcription factor ELISA kits are ideal. TF activation can be detected with as little as 0.5 µg of nuclear extract and the assay can be completed in less than 3.5 hours. The 96-well plate format, with individual strips of 8 wells, is suitable for manual use or high-throughput screening applications. The technology has many applications, including the study of drug potency, inhibitor or activator proteins, and/or protein structure/function in the signaling pathway.

For in vivo analysis of TF activity, we offer luciferase reporter vectors for monitoring and quantifying binding activity. Light emitted from the luciferase reaction is directly proportional to the amount of expressed enzyme, and thus, the binding activity of the targeted TF. The use of the luciferase reporter vectors allows TF activity to be monitored in living cells.

USB Gene Promoter Reporter Vectors also utilize luciferase activity to measure promoter activity. These vectors contain cloned promoter regions of specific TF genes.

Nuclear Extraction Kit
The USB Nuclear Extraction Kit is ideal for preparing nuclear extracts for use with protein/DNA arrays, electrophoretic mobility shift assays (EMSAs), and ELISAs. Combining this kit with our in vitro assays enables optimal consistency in results. This kit facilitates the extraction of functional crude nuclear proteins from various cell types or whole tissue.

Nuclear Extraction Kit

<table>
<thead>
<tr>
<th>Product code</th>
<th>Pack size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AY2002</td>
<td>20 rxn from cell culture</td>
</tr>
<tr>
<td></td>
<td>10 rxn from whole tissue</td>
</tr>
</tbody>
</table>

Transcription Factor Protein/DNA Array
With these arrays, you can profile the activities of multiple TFs simultaneously. This allows the study of TF activation in a variety of biological processes, including cell proliferation, differentiation, transformation, and apoptosis. You can profile from 56 to 345 transcription factors in one array.

Function-specific protein/DNA arrays are also available and designed for researchers who need to focus on transcription factors involved in specific biological processes. We currently offer three function-specific arrays:
- cAMP/Calcium Protein/DNA Array
- Nuclear Receptor Protein/DNA Array
- Cell Growth Protein/DNA Array

- Efficient—profile multiple transcription factors simultaneously
- Easy—all-in-one system; no additional equipment needed
- Safe—no radioactivity required
- High sensitivity—improved HRP-based chemiluminescence
- No antibodies—removes lot to lot variations
- Multiple arrays—choose from a variety of arrays
Transcription Factor EMSA Gel-shift Assays
More than 424 EMSA kits are available covering the most widely studied transcription factors. USB EMSA (Electrophoretic Mobility Shift Assay) Kits are useful tools for validating the presence of transcription factors based on their binding to a respective DNA recognition sequence.

Unlike other commercially available EMSA kits, USB EMSA kits include specific transcription factor probes. We currently offer 345 kits, which correspond to the transcription factors included on the protein/DNA arrays. Additionally, we offer a combination kit, which includes any three probe sets. Probe sets can also be purchased separately.
- Easy—identify DNA-binding proteins
- Economical—all-in-one system
- Highly sensitive—HRP-based detection system
- Safe—no radioactivity required

Transcription Factor ELISA Kits
USB TF ELISA Kits are ideal for identifying and quantifying transcription factors from nuclear extract based on their binding to a respective DNA recognition sequence. The ELISA-based kit combines a fast, 96-well format with a sensitive and specific assay ideal for screening potential effectors of TF activity.
- Specific—quantify transcription factor activation
- Sensitive—detect activation with as little as 0.5 μg cellular extract
- Fast—assay completed in less than 4 hours
- User Friendly—all assays formatted to same workflow

Transcription Factor Reporter Vectors
With transcription reporter vectors, you can monitor the in vivo activation of transcription factors in signal transduction pathways. You can also obtain information about cross-talk between pathways.

Similar to our EMSA gel-shift kits, these reporter vectors are ideal for validating the results obtained using protein/DNA arrays.

Luciferase Reporter Vectors & Gene Promoter Reporter Vectors
With USB Luciferase Reporter Vectors, you can monitor and even quantify the binding activity of transcription factors in a cellular environment. Each reporter vector contains a cis-acting DNA binding element that is recognized by a specific TF. With USB Gene Promoter Reporter Vectors, you can profile the promoter activity of 34 genes.
- Quantitative—use luciferase activity to measure TF binding or promoter activity
- Flexible—use for in vivo assays
- Rapid—get results in hours
- Safe—no radioactivity required

Stable Cell Lines
We offer NFκB, CREB, AP-1, GR, NF-AT, STAT, SRF, and HIF stable reporter cell lines for high-throughput analysis of in vivo drug efficacy and specificity. These stable cell lines also provide a reproducible, ready-to-use platform for performing cell-based assays. Among other applications, they can be used to evaluate uncharacterized growth factors, extracellular stimuli, and upstream events in the NFκB, CREB, AP-1, NF-AT, STAT, SRF, and HIF signaling pathways.
- NFκB Reporter A549, HeLa, 293, NIH3T3 and C2C12 Stable Cell Lines
- NFκB p50 Knockdown Stable Cell Line
- CREB Reporter 293 and CHO Stable Cell Lines
- AP-1 Reporter 293 HeLa Stable Cell Line
- GR Reporter 293 and HeLa Stable Cell Line
- NF-AT Reporter HeLa and K562 Stable Cell Lines
- STAT-1 Reporter HeLa Stable Cell Line
- STAT-3 Reporter HeLa Stable Cell Line
- SRF Reporter HeLa Stable Cell Line
- HIF Reporter NIH3T3 Stable Cell Line
- NFκB p50 Knockdown Stable Cell Line
- TAD-Kinase Reporter Stable Cell Line
- CHO/GFP-NFκBp65 Stable Cell Line

For Research Use Only. Not for use in diagnostic procedures.
Affymetrix and USB are registered trademarks of Affymetrix, Inc.