Surface Plasmon Resonance (SPR) Service

Introduction
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Surface plasmon resonance (SPR) technology is developed at the end of the 20th century. It is used in the bioscience field to determine the interaction between ligand and analyte on a biosensor chip according to the SPR principle. Profacgen offers professional SPR service for highly efficient and sensitive interaction detection between biomolecules.

SPR based Biosensor was first introduced as a real-time, non-labeling technique for the analysis of biological interaction in the early 1990s[1]. Label-free detection and real-time analysis, coupled with the recent development of portable instruments make SPR biosensor systems excellent candidates for care detection devices, environmental monitoring systems, and general laboratory instruments[2].

SPR technology has broad application in physics, chemistry and biology. Among them, biological application has made great contribution to both clinical diagnosis and scientific research.
Profacgen provides various types of SPR biosensors for various applications, including Biacore T200, Biacore 4000 and Biacore X100.

### SPR Biosensor Parameters

<table>
<thead>
<tr>
<th></th>
<th>Biacore T200</th>
<th>Biacore 4000</th>
<th>Biacore X100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample types</strong></td>
<td>Low molecular weight (MW) drug candidates, large proteins, DNA, RNA, polysaccharides, lipids, cells and viruses in various sample environments</td>
<td>Low molecular weight (MW) drug candidates and large proteins in various sample environments (e.g. DMSO-containing buffers, plasma or serum)</td>
<td>Low molecular weight (MW) drug candidates, large proteins, DNA, RNA, polysaccharides, lipids, cells and viruses in various sample environments</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>48 h unattended operation</td>
<td>72 h unattended operation</td>
<td>24 h unattended operation</td>
</tr>
<tr>
<td><strong>Injection volume</strong></td>
<td>2-350 ul</td>
<td>30-425 ul</td>
<td>5-90 ul</td>
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<tr>
<td><strong>Capacity</strong></td>
<td>96 or 384 well microplate+33 reagent vials</td>
<td>10 rack trays, each with a microplate (384- or 96-)+24 well reagent plate</td>
<td>15 samples</td>
</tr>
<tr>
<td><strong>Instrumental size</strong></td>
<td>615×690×600 mm</td>
<td>1541×623×793 mm</td>
<td>596×563×593 mm</td>
</tr>
<tr>
<td><strong>Molecular weight</strong></td>
<td>No limits</td>
<td>&gt;50 Da</td>
<td>&gt;100 Da</td>
</tr>
<tr>
<td><strong>Association Rate Constant (kₐ)</strong></td>
<td>$10^3 - 3\times10^9$ M⁻¹ S⁻¹</td>
<td>$10^3 - 10^9$ M⁻¹ S⁻¹</td>
<td>$10^3 - 10^7$ M⁻¹ S⁻¹</td>
</tr>
<tr>
<td><strong>Dissociation Rate Constant (kₐ)</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Analysis temperature</strong></td>
<td>4 - 45°C</td>
<td>4 - 40°C</td>
<td>4 - 40°C</td>
</tr>
<tr>
<td><strong>Sample concentration</strong></td>
<td>$10\times10^{-12}$ M</td>
<td>$100\times10^{-12}$ M</td>
<td>N/A</td>
</tr>
<tr>
<td>Application</td>
<td>Kinetics characterization; affinity characterization; concentration measurement; low MW interaction analysis; thermodynamic characterization; sample recovery for MS</td>
<td>Fragment and low MW compound screening; compound hit validation; hit-to-lead characterization; antibody screening and characterization</td>
<td>Kinetics; affinity; specificity; concentration</td>
</tr>
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</table>

**Sample preparation:**

Your sample for SPR should meet the following requirements:

- Solution should be uniform without any granule or sediment. Protein aggregation should not be exist.
- Purity of ligand should be >70%; purity of analyte should be >90%. SDS-PAGE or chromatography data can be provided to validate purity.
- Accurate concentration of both ligand and analyte should be provided.
  Concentration of ligand should be >200ug/ml. Concentration of analyte should be >1 mM.
- Quantity of both ligand and analyte provided should be >500 ul.
- For protein samples, definite isoelectric point (should be between 3 and 7) and molecular mass information should also be provided.
- Buffer should not contain high refractive index material such as glycerol, sucrose or imidazole. We should be notified the detail ingredient of your sample buffer (pH, concentration of any additive, surfactant and reducing agent, etc.) and any specific requirements for the buffer. The buffer for ligand should not contain substances with active amino groups such as Tris.
- If the protein sample has a protein tag, the name of tag should be provided. If the sample is an antibody, the antibody subtype should be provided.
- Relating evidence should be provided if protein-protein interaction has been verified, such as in a pull-down assay or co-IP.
- The source of protein sample should be given (extracted from natural sources, purchased from vendor or recombinantly expressed and purified).
- Small molecule analytes should be able to be dissolved in 5% PBS.
- Reference papers can be provided if any.
- Sample should best be delivered with dry ice.
Notes:
✧ The detection format of the SPR biosensor can be chosen according to the size of the target analyte and whether continuous monitoring is required. The detecting methods can be classified into two categories: direct detection methods and indirect detection methods.
✧ SPR biosensor system can monitor binding events between molecules ranging from ions to viruses. Detection of medium-size and large-size analytes (>10,000 Da) is usually performed directly. For small-size analytes, competition assay, sandwich assay or inhibition assay can be used.

Profacgen SPR service has the following features:
➢ Advanced instruments
➢ Experienced technician
➢ Best price in the market
➢ Detailed and reliable analysis results

We will provide experimental raw data, analysis result, reagent, instrument and software retrieval parameter in the final experiment report. The following can be learned from this assay:
✓ **Binding**: Whether the binding happens or not
✓ **Specificity**: Which molecule can bind to the ligand
✓ **Quantity:** Concentration of interacting molecules
✓ **Kinetics:** Binding speed, association rate constant (ka), dissociation rate constant (kd)
✓ **Affinity:** The degree of binding, the complexity of the binding
✓ **Binding pattern:** Binding pattern identification
