Chinese Hamster Ovary (CHO) cells are widely used in large-scale culture. These cells have conventionally been grown as attached cultures, but they will also grow in suspension, a property which has allowed for relatively simple scale up in stirred tank and airlift bioreactors. Unfortunately, some CHO-derived lines which have been adapted to suspension growth can form large, tightly bound aggregates in culture.

Why is clumping a problem?
- For batch suspension cultures, cell aggregation hinders accurate cell counting, monitoring and control of the cellular environment
- Transport of nutrients to, and products from, the cells may be impaired
  - Cluster formation dramatically influences the growth behavior of the cells
- Cells within aggregates show a strongly reduced specific proliferation rate
- Shear forces exerted on large aggregates cause a considerably higher specific death rate than those exerted on single cells, reducing the specific growth rate up to 50%

Approaches to solving the problem of cell aggregation have proven to be less than satisfactory, until now…. Lonza introduces Anti-clumping Agents A and B, two ready-to-use solutions designed to minimize CHO cell clumping in suspension cultures. Both solutions are made exclusively of non-animal origin components.

- Anti-clumping Agent A is a buffered, concentrated solution of Dextran sulfate, and recommended usage is at 100X dilution
- Anti-clumping Agent B is a buffered, concentrated solution of ferric citrate, and recommend use it at 100X or 200X dilution
Control image shows clusters of CHO CRL-11397 cells grown in suspension culture.

CHC CRL-11397 cells, grown with Anti-clumping Agent A (Dextran sulfate), do not aggregate in suspension culture.

CHC CRL-11397 cells, grown with Anti-clumping Agent B (Ferric citrate), do not aggregate in suspension culture.

As a result of using Anti-clumping Agents from Lonza, clumping of cells cultured in serum-free medium is minimized, leading to a significant increase in cell density and productivity.

As noted in the below graph, the effect of both agents on CHO cells seeded in PowerCHO® 3 Medium is obvious. Cell density is significantly increased by the addition of Anti-clumping Agent B after just three days in culture, while, after seven days on culture, both Anti-clumping Agents A and B exhibit increased productivity of 20 up to 35%.

Resolution of clumping problems in CHO cells leads to a significant increase in the cell density and productivity.

**Ordering Information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Cat. No.</th>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-clumping Agent A (Dextran sulfate base)</td>
<td>BERD047E</td>
<td>100 ml</td>
<td>50 €</td>
</tr>
<tr>
<td>Anti-clamping Agent B (Ferric citrate base)</td>
<td>BERD048E</td>
<td>100 ml</td>
<td>40 €</td>
</tr>
</tbody>
</table>

Store at 15° – 30° C