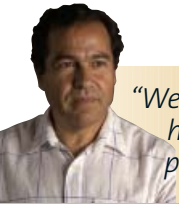


# BIOPROCESS SECTOR

Biotechnology Research Institute

INFORMATION

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*"We are developing high cell-density processes for the production of recombinant proteins and viral vectors, by growing suspension cultures in serum-free media under batch, fed-batch or perfusion conditions."*

## Animal Cell Technology

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## ANIMAL CELL TECHNOLOGY

BRI's Animal Cell Technology Group is actively involved in research and development of animal cell bio-processes for the production of recombinant proteins. Although it was initially recognized for its work in insect cell culture, a field in which it continues to excel, the group has expanded its activities to include mammalian and human cell processes for the production and purification of recombinant proteins and viral vectors for gene therapy applications.

### Our Research Activities

- ▶ Development of insect cell cultures for the production of recombinant proteins and viral vectors using the baculovirus expression system (BEVS) or stable cell lines
- ▶ Development of mammalian cell cultures for the production of recombinant proteins and viral vectors using large-scale transfection or stable cell lines
- ▶ Process development at up to the 100 L scale for the high-density cultivation of animal cells
- ▶ Development and scale-up of viral vector purification processes for gene therapy applications

### Our Services

- ▶ Adaptation of mammalian cells to suspension cultivation and serum-free medium
- ▶ Production of recombinant proteins by transient transfection up to the 100 L scale
- ▶ Production and purification of recombinant proteins by baculovirus/insect cell system up to the 100 L scale
- ▶ Production and purification of viral vectors (adenovirus, adeno-associated virus and retrovirus) up to the 100 L scale
- ▶ Medium development to maximize yield of recombinant proteins by mammalian cells.
- ▶ Scale-up of integrated processes for therapeutic proteins (from cDNA to purified material) by production in batch, fed-batch or perfusion mode with mammalian cells up to the 100 L scale
- ▶ Production and characterization of biological material for preclinical trials

### Research Examples

- ▶ Production of a vast array of cytosolic, secreted and membrane proteins using various animal cell lines, including Sf9, Sf21, BTI-Tn-5, CHO, HEK293, NSO, Jurkat, JY1, Bowes melanoma, etc.
- ▶ Development of robust, scalable and cGMP-compliant integrated processes for the production and purification of recombinant viral vectors for gene delivery. The viral vectors of interest are adenovirus (AdV), adeno-associated virus (AAV), retrovirus (RV) and baculovirus (BacMam). We are continuing to develop processes with Sf9 cells for BacMam and AAV, and HEK293 cells for AdV, AAV and RV.
- ▶ Development of a large-scale transfection process that enables fast and efficient recombinant protein expression. The process can be scaled up to 100 L, in serum or serum-free medium, and has been validated with over 50 recombinant proteins. Starting from the cDNA, we have achieved expression levels of up to 100 mg of recombinant protein per litre of cell culture in less than 3 weeks.
- ▶ Optimization of cell yields, recombinant proteins and viruses by employing fed-batch processes and complex addition schemes, thanks to our flexible process control system. This system is supported by unique on-line sensors, such as the green fluorescent protein (GFP) probe developed within our lab or the capacitance sensor used for viable biomass monitoring.
- ▶ Development of outstanding expertise in perfusion processes, utilizing acoustic filter systems that are operated at rates of up to 200 L/day.

### Our Business Approach

Through service contracts and the licensing of our technologies, BRI's dynamic, flexible team supplies customized solutions for our partners' needs. In addition, BRI provides access to a number of advanced technologies and a wide variety of experts who regularly publish in leading scientific journals.

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