

# Navigating Recombinant Protein Production- Leveraging Aragen's Multifaceted Expression Systems



Recombinant protein production holds significant importance across diverse fields including medicine, agriscience, and industrial processing. It requires efficient expression systems for advancing proteins from discovery to clinical applications. Lately, protein expression systems have expanded to include diverse organisms like bacteria, yeast, insects, and mammalian cells. Each of these systems have unique advantages and challenges. Thus, the selection of a suitable expression system is based on factors like protein complexity, post-translational modifications (PTMs), scalability, and cost-effectiveness.

## Diverse Recombinant Expression Systems at Aragen

At Aragen, our scientists leverage diverse expression systems to screen through multiple hosts and identify the most effective one, facilitating efficient recombinant protein expression. By optimizing downstream protein production and enhancing its quality, we expedite our clients' projects. We offer protein production in the following systems:

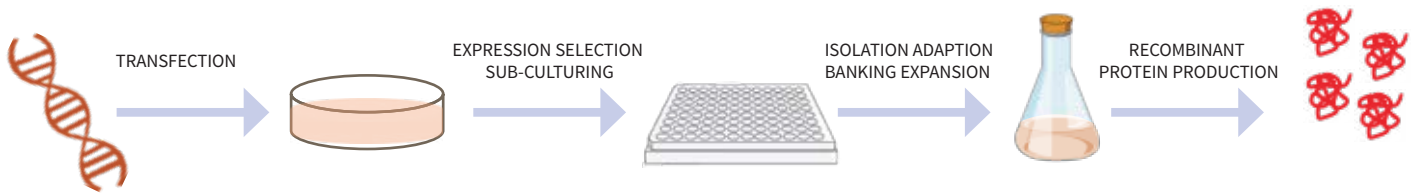
### Mammalian cells

- Selecting the right mammalian cell line is critical in antibody drug discovery, impacting the expression levels, glycosylation patterns, scalability, and regulatory acceptance of the final therapeutic product.
- CHO and HEK293 cells are the most favored cell lines due to their well-established protocols and compatibility with large-scale production, for both stable and transient expression.

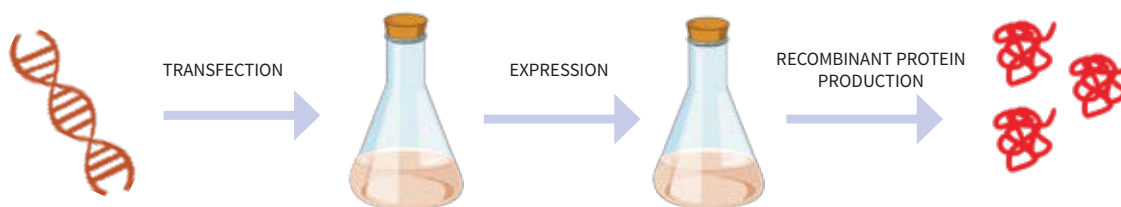
**Aragen's Current capacities:** Multiple shake flasks- up to 80 L at a time; Wave bioreactor- 2 x 25 L; BioFlo 320: 5 L (using SUV can go to 40 L).

## Mammalian cell-based expression system: workflow

### A. Stable expression



### B. Transient expression



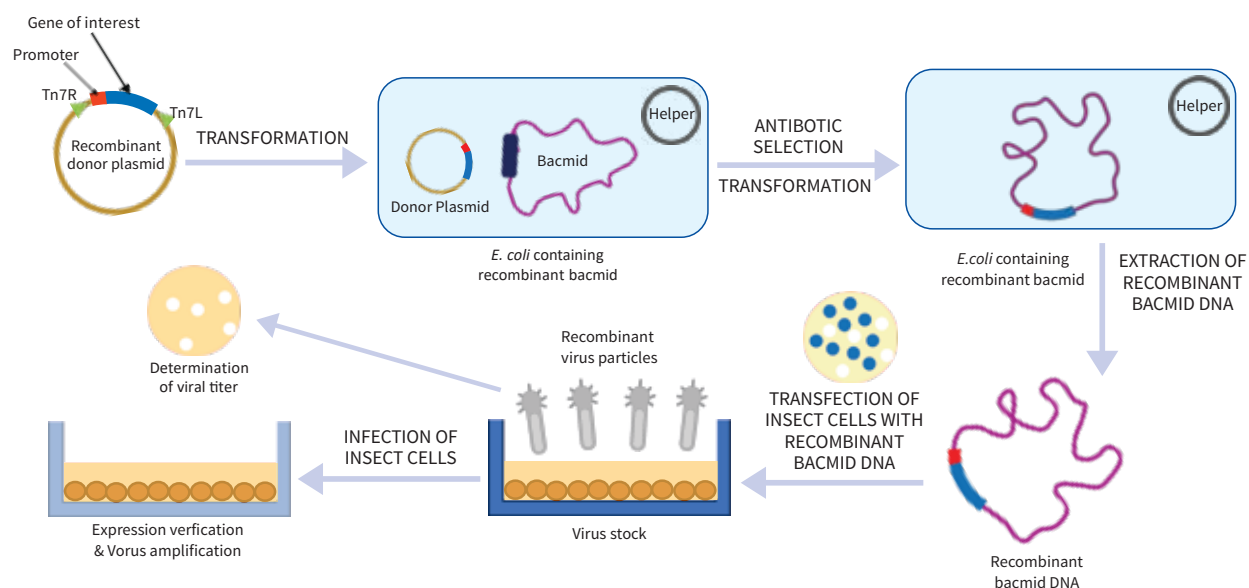
**Figure 1:** Workflow of mammalian cell-based stable (A) and transient (B) expression systems.

## Insect cells

- Insect cells offer PTMs such as glycosylation, acetylation, disulphide bond formation, etc., scalability for large-scale production, and reduced contamination risks, providing a versatile platform for recombinant protein production.
- Large-scale production of recombinant baculovirus is achieved using Sf9 cells to support large-scale protein production.
- A higher yield of protein is achievable in Hi-Five, Sf9, and Sf21 cells using the animal-free media, resulting in better protein quality.

**Aragen's Current capacities:** Multiple shake flasks- up to 65 L at a time; Wave bioreactor- 2 x 25 L.

## Insect cell-based expression system: workflow



**Figure 2:** Schematic representation of insect-based expression system (Bac-to-Bac system) workflow.

Source: F.J. Haines, R.D. Possee, L.A. King, *Baculoviruses: Expression Vector*, Editor(s): Brian W.J. Mahy, Marc H.V. Van Regenmortel, *Encyclopedia of Virology (Third Edition)*, Academic Press, 2008, Pages 237-246.

## Yeast cells

- *Pichia pastoris* strains such as X-33 and GS115 are integral to producing high-quality recombinant proteins with complex PTMs at a significantly less cost than insect and mammalian expression systems.

**Aragen's Current capacities:** Multiple shake flasks- up to 10 L at a time.

## Yeast expression system: workflow

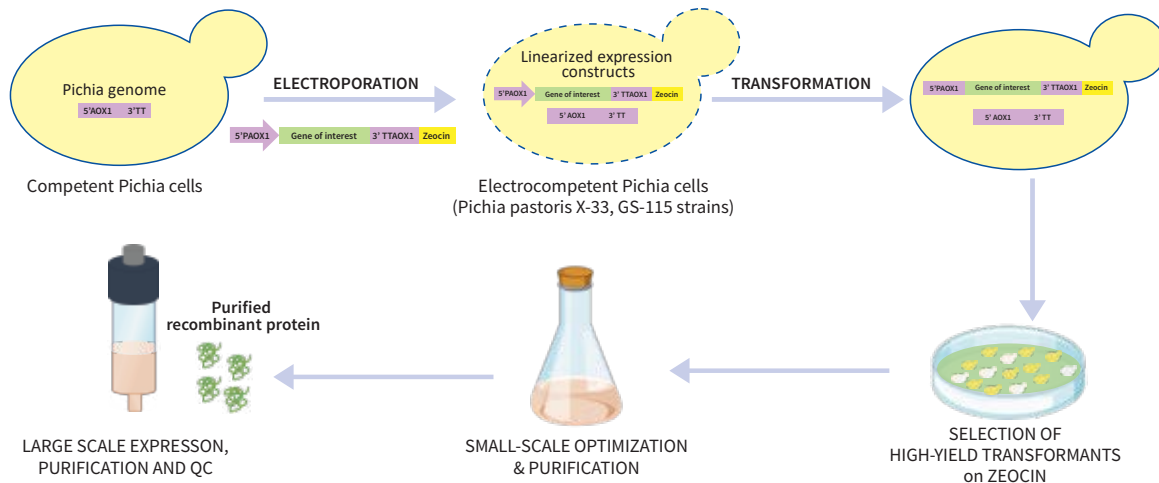


Figure 3: Workflow of yeast-based expression systems.

## Bacterial cells

- *Escherichia coli* (*E. coli*) is a versatile and efficient host for recombinant protein expression.
- *E. coli* expression strains such as BL21(DE3), Rosetta, BL21-AI, SHuffle, Origami each offer specific benefits like enhanced expression or improved disulfide bond formation and proper protein folding.

**Aragen's Current capacities:** Multiple shake flasks- up to 100 L at a time; BioFlo 120: 5 L.

## Benefits for Customers

Coupled with our team's 10+ years of experience and depth of expertise in recombinant protein production and analytical processes, Aragen provides:

- **Expression Screening and Customization:** We offer a streamlined approach to protein expression, screening and customization, providing fast solutions all in one place, saving time and resources.
- **Multi-Host Approach:** Our multi-host expression system has been embraced by numerous biopharma customers, driving accelerated progress in their R&D initiatives.
- **Proven R&D:** Leading biopharma companies are already leveraging our multi-host expression system to broaden their R&D capabilities, producing a diverse array of antibodies, cytokines, and enzymes.

Unlock breakthroughs with Aragen! Our agile multi-expression solutions empower your R&D-speed, flexibility, tailored precision-making us your trusted biopharmaceutical partner.

Let's begin the conversation



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