# Sustained Viability Unlocks Extended Productivity Across CHO Transient Expression Hosts

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## 1. Introduction

Transient gene expression (TGE) in Chinese hamster ovary (CHO) cells is widely used for rapid production of recombinant proteins during early-stage biotherapeutic research and development [1,2]. However, the performance of transient expression systems can depend strongly on the CHO host background, and commercially available platforms are often optimized for specific cell lines, such as CHO-S or CHO-K1-derived cells [1,2,3].

The OPM CD Trans® CHO Plus Expression System was developed as a streamlined, high-performance platform for transient protein production in CHO cells. Its FlashFection™ workflow enables direct addition of plasmid DNA and transfection reagent to the cell culture without separate dilution or pre-mixing steps, thereby reducing workflow complexity and simplifying transfection setup.

In this study, we evaluated the performance and host-cell compatibility of the OPM system in both CHO-S and CHO-K1-derived cells using two recombinant protein formats: an Fc-fusion protein and a monoclonal antibody (mAb). Performance was benchmarked against two leading commercially available transient expression systems optimized for the respective CHO host backgrounds.

**Objective**: Evaluate the productivity, culture longevity, and cross-host compatibility of the OPM CD Trans® CHO Plus Expression System in CHO-S and CHO-K1-derived cells relative to leading commercial transient expression systems.

## 2. Materials & Methods

| Category | Description |
|---|---|
| Cell Lines | CHO-S and CHO-K1 derived cell lines |
| Expression Systems | OPM CD Trans CHO Plus Expression System, Competitor CHO-S-/CHO-K1-Optimized Expression Systems |
| Protein Models | Fc-based fusion protein (n=1: CHO-S; n=2: CHO-K1) and mAb (n=2: CHO-S & CHO-K1) |
| Seeding Density | CHO-S: 6 × $10^6$ cells/mL; CHO-K1 derived : 9 × $10^6$ (Competitor) and 6 × $10^6$ cells/mL (OPM) |
| Culture Conditions | 37 °C, 8% $CO_2$, orbital shaking; cells passaged 1 day prior to transfection |
| Transfection Conditions | Cell viability confirmed prior to use; plasmid DNA added according to manufacturer's protocol; DNA:Transfection Reagent ratio adjusted based on system |
| Analytical readouts | VCD (viable cell density), viability, titer, glucose (not shown here) and lactate |

## 3. Simplified Protein Expression Workflow

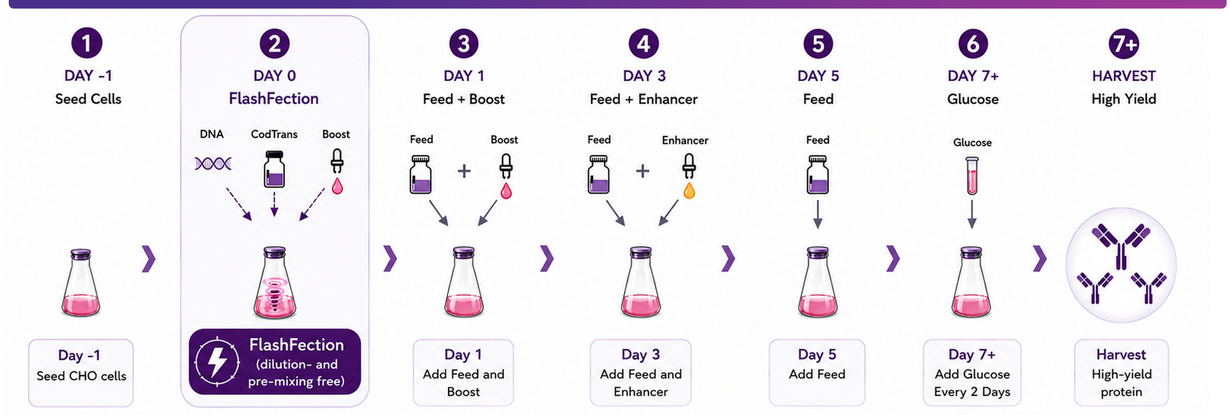


**Figure 1. Simplified workflow for the OPM CD Trans® CHO Plus Expression System.** The FlashFection™ workflow enables direct addition of plasmid DNA and transfection reagent to the culture without separate dilution or pre-mixing steps, followed by scheduled Feed, Boost, Enhancer, and glucose supplementation.

### 4.1 Results: OPM vs. Competitor CHO-S Optimized System

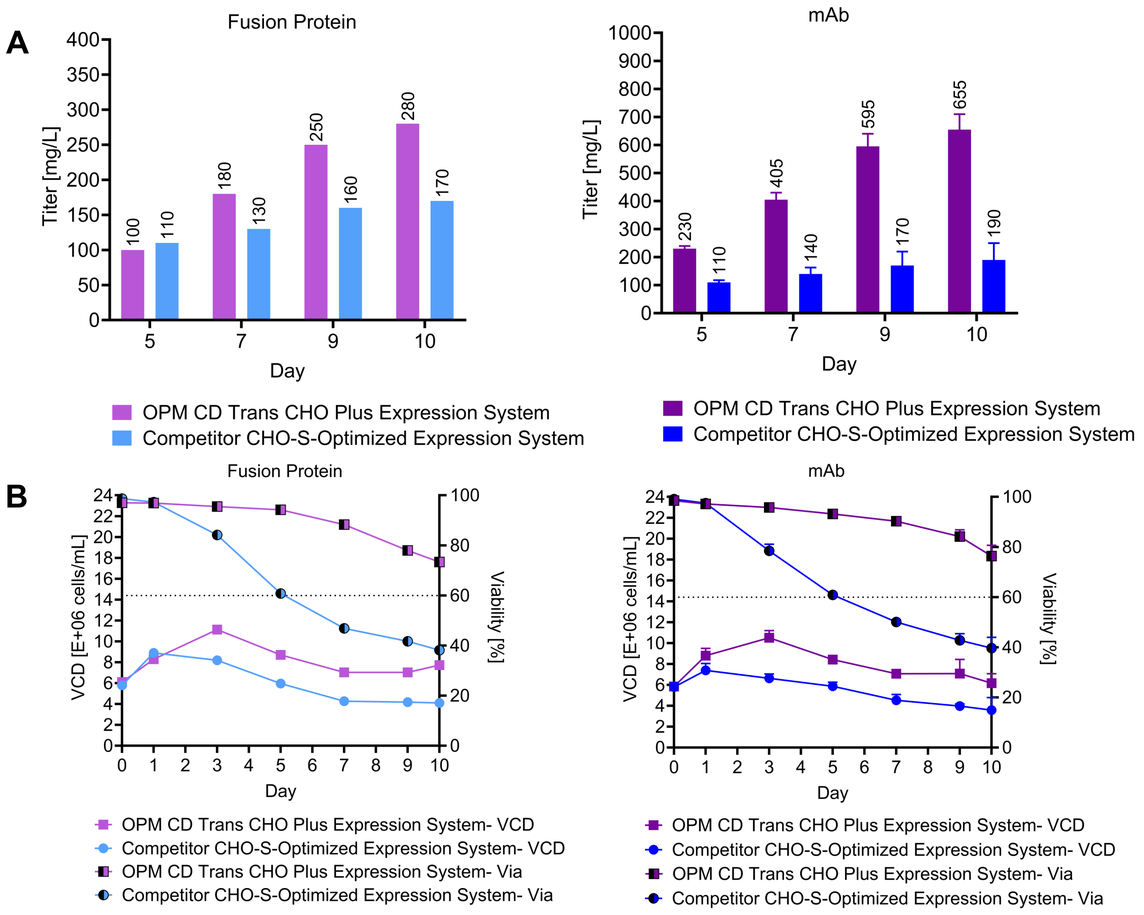


**Figure 2. OPM CD Trans® CHO Plus sustains viability and extends protein production in CHO-S cells. (A)** Protein titers for Fc-fusion protein and mAb. **(B)** VCD and viability profiles throughout the culture. OPM maintained substantially higher viability through Day 10, supporting continued protein production and higher late-stage titers compared with the competitor CHO-S-optimized expression system.

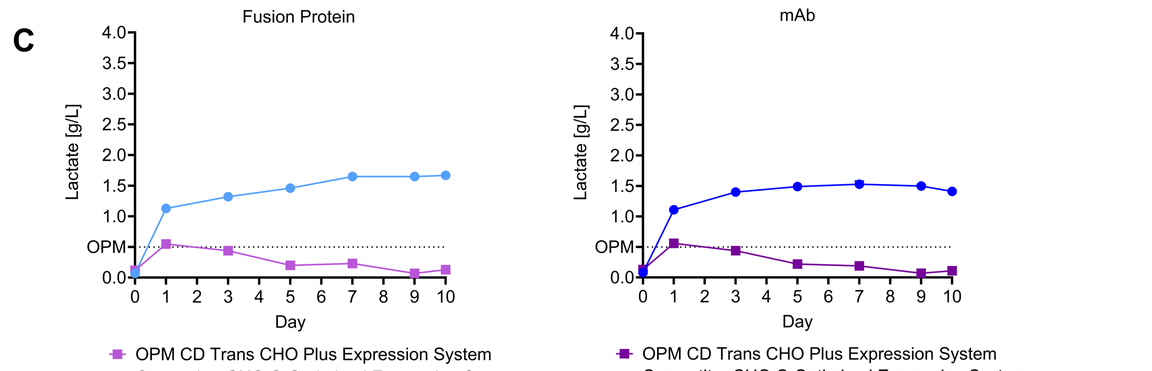


**Figure 2. Lactate profiles in CHO-S cells.** OPM CD Trans® CHO Plus maintained low lactate levels throughout the culture for both the Fc-fusion protein and human IgG, while greater lactate accumulation was observed with the competitor CHO-S-optimized expression system.

### 4.2 Results: OPM vs. Competitor CHO-K1 Optimized System

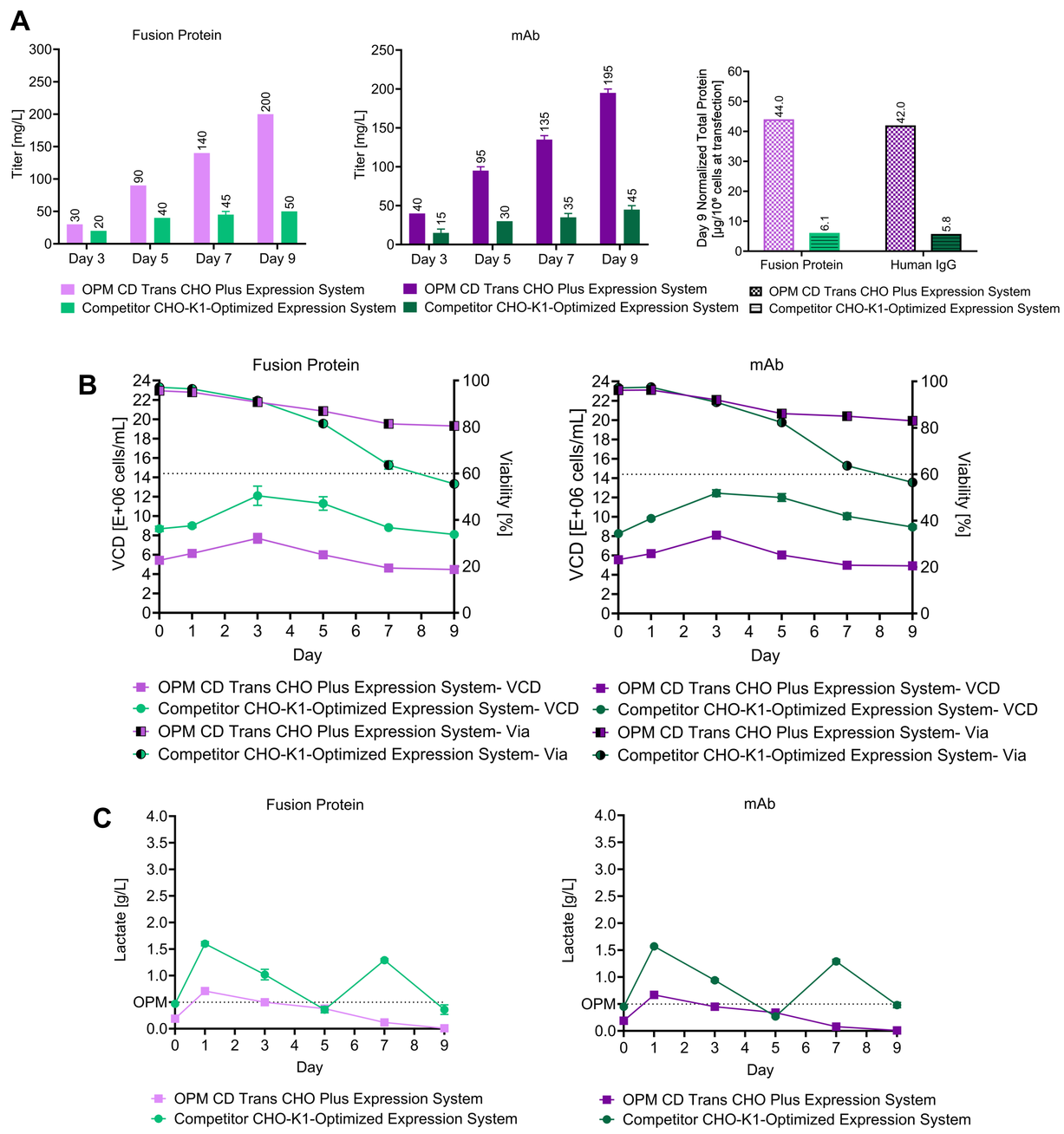


**Figure 3. OPM CD Trans® CHO Plus improves sustained productivity in CHO-K1-derived cells. (A)** Protein titers and Day 9 normalized total protein for Fc-fusion protein and mAb. **(B)** VCD and viability profiles throughout the culture. **(C)** Lactate profiles. OPM maintained higher culture viability and sustained protein production through Day 9, resulting in substantially greater normalized total protein than the CHO-K1-optimized expression system. OPM also maintained low lactate levels, particularly during the later stages of culture, while greater lactate accumulation was observed with the competitor system.

## 5. Conclusions

- OPM CD Trans® CHO Plus demonstrated robust performance across both CHO-S and CHO-K1-derived host backgrounds and across two recombinant protein formats.
- Sustained culture viability extended the productive phase, enabling continued protein production and higher late-stage titers compared with host-optimized commercial expression systems.
- OPM demonstrated a substantial productivity advantage across both CHO host backgrounds and protein formats:

| CHO Host | Protein | Comparison Day | OPM Fold Increase vs. Competitor (~) |
|---|---|---|---|
| CHO-S | Fusion protein | Harvest day | 1.5 × |
| | mAb | | 3.5 × |
| CHO-K1-derived | Fusion protein | | 7 × |
| | mAb | | 7 × |

- Together with the simplified FlashFection™ workflow, these results support OPM CD Trans® CHO Plus as a versatile platform for transient CHO protein expression.

**Acknowledgements**

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**References**

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[3] Geisse, Sabine, and Cornelia Fux. *Methods in enzymology* vol. 463 (2009): 223-38.

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