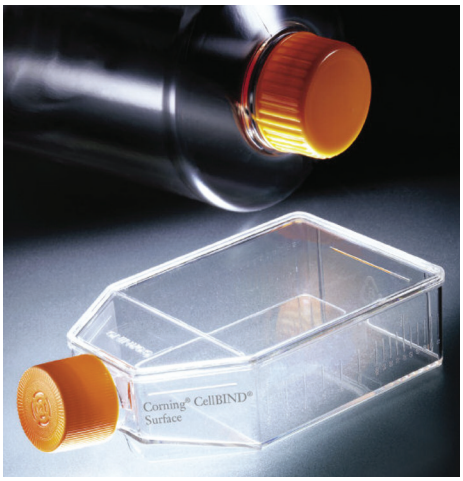
Synergistic Effect of HEK 293 Cells Grown in Serum-free Medium with the Corning® CellBIND® Surface

CORNING

Application Note

Helen L. Krasnow, Ana Maria, P. Pardo, Todd Upton, and Debra Hoover
Corning Incorporated, Life Sciences
Kennebunk, ME USA

Introduction



An important part of adherent cell culture media is serum, which aids in both cell attachment and cell growth. However, rising costs of culture, decreased availability, lot-to-lot variation, contamination issues, and downstream processing needs have led researchers and production labs to reduce or eliminate the use of serum in their processes. Most adherent cell lines can be adapted to grow in reduced serum concentrations; however, this often leads to a reduction in or a loss of cell attachment. The Corning CellBIND surface is manufactured using a technology which can enhance cell attachment under reduced (or no) serum growth conditions. Here we use HEK 293 cells, a human cell line commonly used in both academic and industrial research, to demonstrate the advantage of combining the CellBIND surface and serum-free media for adherent cell growth.

Materials and Methods

Cells used for this study were maintained in IMDM medium containing 10% fetal bovine serum. To initiate the study cells were harvested, washed twice and resuspended in a commercially available serum-free media. The cells were seeded in triplicate in standard Tissue Culture (TC)-treated and CellBIND surface treated (Cat. No. 3290) T-75 flasks at a density of 1 x 10^6 cells/flask. Cells were incubated at 37°C; 5% CO_2 for 96 hours. At the end of the culture period, adherent cells were harvested and enumerated using a hemocytometer.

Results and Discussion

As can be seen in Figure 1, the cells grown serum-free on the CellBIND surface (right panel) show the characteristic flattened shape of adherent cells (arrows), whereas cells on a standard TC-treated surface are generally rounded. Additionally, there is a greater number of attached cells on the CellBIND surface as compared to a standard TC-treated surface. Importantly, when these cultures were allowed to grow for 96 hours, there were substantially more adherent cells attached to the CellBIND surface (2.93 x 10^6) as compared to the TC-treated surface (1.73 x 10^6) (Figure 2). Comparing the results from 3 independent experiments indicated this difference was statistically significant (two-tailed t test, p = 0.01).

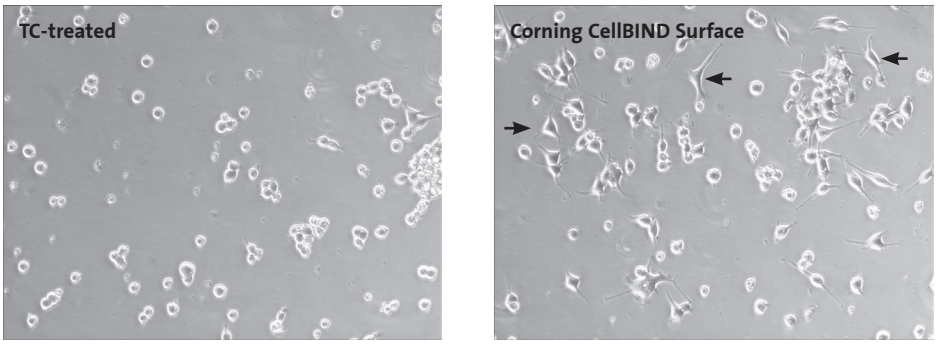


Figure 1. Representative field of HEK 293 cells grown under serum-free conditions on the standard TC-treated surface (left) and Corning CellBIND surface (right) at 24 hours. Light micrograph (100X magnification).

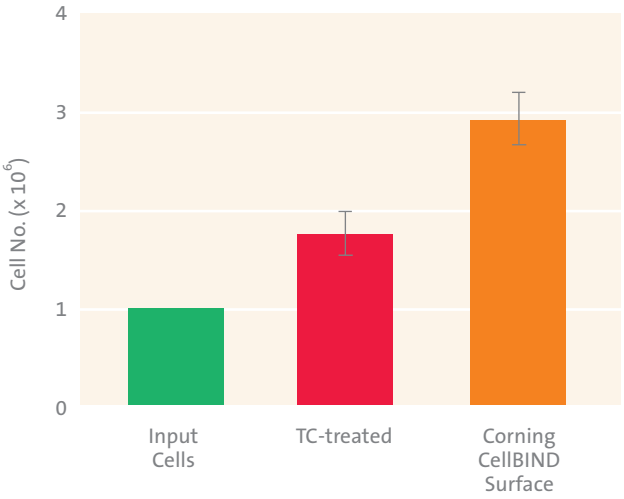


Figure 2. HEK 293 cell yields on the standard TC-treated surface and Corning CellBIND surface using commercially available serum-free medium. Data is the average ± S.E. of 3 independent experiments.

Conclusions

- Under these serum-free conditions, HEK 293 cells maintain a more normal/flattened adherent morphology on the standard TC-treated surface versus a Corning® CellBIND® surface.
- The improved adherence of HEK cells on the Corning CellBIND surface results in 69% more cells at 96 hours as compared to cells grown on standard TC-treated surfaces.
- The Corning CellBIND surface yields a greater number of total cells (adherent and non-adherent) during the time course of the study.

CORNING

Corning Incorporated
Life Sciences

www.corning.com/lifesciences

NORTH AMERICA
t 800.492.1110
t 978.442.2200

ASIA/PACIFIC
Australia/New Zealand
t 61 427286832
Chinese Mainland
t 86 21 3338 4338
India
t 91 124 4604000
Japan
t 81 3-3586 1996
Korea
t 82 2-796-9500
Singapore
t 65 6572-9740
Taiwan
t 886 2-2716-0338

EUROPE
CSEurope@corning.com
France
t 0800 916 882
Germany
t 0800 101 1153
The Netherlands
t 020 655 79 28
United Kingdom
t 0800 376 8660
All Other European Countries
t +31 (0) 206 59 60 51

LATIN AMERICA
grupoLA@corning.com
Brazil
t 55 (11) 3089-7400
Mexico
t (52-81) 8158-8400