General Guidelines for Corning® Microcarriers

Protocol

CORNING

Product Specifications

Microcarrier	Bead Size (µm)	Density (cm^3/g)	Surface Area (cm^2/g)	Agitation Rate (rpm)*
Positively-charged (Cat. No. 3787)	160 - 200	~1.09	515	40 - 60
Low Concentration Corning Synthemax® II (Cat. No. 3781)	125 - 212	~1.026	360	20 - 40
High Concentration Corning Synthemax II (Cat. No. 3784)	125 - 212	~1.026	360	20 - 40
Enhanced Attachment (Cat. No. 3779)	125 - 212	~1.026	360	20 - 40
Collagen-coated (Cat. No. 3786)	125 - 212	~1.026	360	20 - 40
Untreated (Cat. No. 3772)	125 - 212	~1.026	360	20 - 40

* Agitation rate depends on impeller design, and choice of vessel selected (e.g., spinner flask, bioreactor, etc.). These recommended rates are based on the use of Corning Spinner flasks.

Corning microcarriers can either be (1) stored reconstituted in water at 4°C or (2) aseptically transferred directly to vessel and reconstituted in medium.

General Guidelines for Selecting a Suitable Microcarrier**

Microcarrier	General Guidelines
Positively-charged (Cat. No. 3787)	Cell line is typically cultured on a positively-charged surface (e.g., Poly-D-Lysine, Corning® PureCoat™ Amine).
Low Concentration Corning Synthemax® II (Cat. No. 3781)	Cells cultured under serum free conditions (e.g., MSC).
High Concentration Corning Synthemax II (Cat. No. 3784)	iPSC, ESC, or other specialized cell types cultured under serum-free conditions.
Enhanced Attachment (Cat. No. 3779)	Cell line is typically cultured on a negatively charged surface (e.g., TC-treated or Corning CellBIND® Surface).
Collagen-coated (Cat. No. 3786)	Cell lines with low attachment efficiency (less than 50%) to other microcarriers or cell lines typically cultured on collagen-coated surfaces.
Untreated (Cat. No. 3772)	If a different coating is required than those described above, these microcarriers may be coated. Cell line is difficult to detach from other microcarriers, cells may detach easier from untreated surface.

** Please note selection of microcarrier will be cell line, application, and medium dependent. Therefore, it is best to evaluate multiple surfaces in order to select the best microcarrier for the application.

General Guidelines for Cell Attachment on Corning® Microcarriers:

1. To ensure an even distribution of the cells on the microcarriers, a single cell suspension with a minimal amount of cell clumps in the inoculum is recommended at the time of seed. A cell strainer may be required to prepare a single cell suspension.
2. To promote cell attachment, it is important to equilibrate the culture medium and vessel in the incubator prior to cell seeding. For smaller volumes (<500 mL), 5 to 15 minutes (depending on volume) of pre-equilibration will be sufficient. However, for larger volumes (e.g., 50 to 100L), an overnight incubation may be necessary to ensure proper temperature, pH, and gas equilibrium. These variables are factors that can impact cell attachment and should be considered when developing the protocol.

3. If seeding cells onto the Positively charged microcarriers, it is recommended to add the cells under continuous agitation to ensure an even distribution. Most cells attach to the positively charged microcarriers at a faster rate compared to other microcarriers.
4. For cell lines that do not attach readily, a static period or overnight incubation with intermittent agitation may enhance cell attachment.
5. Some cell lines may not expand as expected within the initial 24 to 48 hours while they adjust to the agitation. As a result, optimize by seeding cultures at higher densities compared to what is typically used for static cultures.
6. To better understand and fully optimize cell attachment on the microcarriers, it is recommended to evaluate the cells/mL in the culture over a period of time (0 to 4 hours). As the cells attach to the microcarriers, the concentration of cells in the medium will decrease. The Falcon® 5 mL Round Bottom Tube with cell strainer cap (Corning Cat. No. 352235) can be used for easy separation of microcarriers from medium.
7. For more information on how various parameters (e.g., serum, agitation rate, and medium) can impact cell attachment and expansion, please see Application Note CLS-AN-243.

General Guidelines for Cell Expansion on Corning Microcarriers

1. If performing studies in a Corning Spinner flask, it is critical to verify that the selected stir plate is validated for use in a humidified (>95%) incubator at 37°C. If the stir plate is not rated for high humidified incubators, excess heat can be generated beyond 37°C, leading to cell death.
2. If new to microcarriers, it is best to evaluate multiple surfaces to identify the best surface for your application.
3. During the optimization studies, multiple samples should be analyzed throughout the time in culture to quantify cell growth on the microcarriers (i.e., lyse the cells attached to the microcarriers and perform a nuclei count).
4. Throughout the time in culture, the agitation rate may need to be increased to ensure that all microcarriers remain in suspension and to minimize aggregation of the microcarriers.

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