

PVA Microcarriers



PVA Microcarriers
for large-scale cell culture

For Research Use Only

kuraray

Development Concept of PVA Microcarriers

Microcarriers
for regenerative
medicine
research

PVA Microcarriers series are produced by Kuraray.
They are made from PVA (Polyvinyl Alcohol).
They can solve the following issues
in the manufacturing of cells for regenerative medicine research.

1

Obtain enough
number of cells

2

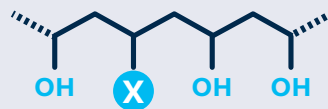
Assure medical-
grade safety

PVA Microcarriers Manufacturing Method

1



Polyvinyl Alcohol (PVA)
Resin with high elasticity,
solubility and high biocompatibility.



Partially modify the hydroxyl groups

2



Ink
Solution of new modified PVA.

3

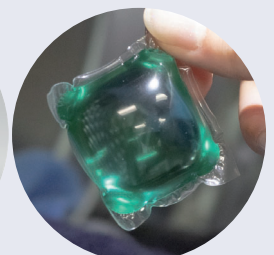
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PVA Microcarriers(non-coated)
Micron-sized hydrogel beads
are made by cross-linking PVA.



Kuraray's other PVA products

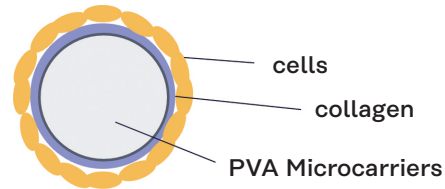
- Polarizing film in LCD
- Water-soluble films for detergent



PVA Microcarriers CL

PVA Microcarriers CL

Clinical grade collagen is coated on the particle surface. Endotoxin and virus in the collagen have been reduced or inactivated.



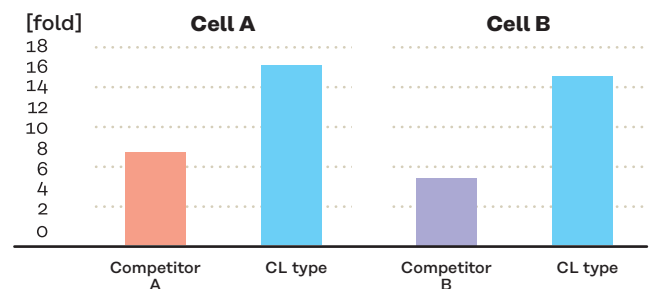
Characteristics of PVA Microcarriers CL

1

High cell proliferation rate

Therapeutic cells, such as MSCs, can easily expand on CL type carriers.

Human cells cultured on various microcarriers for 7 days. Each bar shows the fold of the initial cell number.



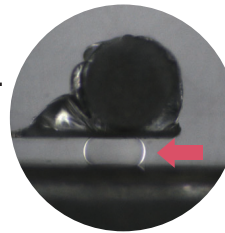
2

Quality management in accordance with medical standards

PVA Microcarriers series are made from Kuraray's PVA[※]. We conduct strict quality management to assure extremely low risk of contamination.

※Polyvinyl Alcohol

Safety test	Result
Cytotoxicity	Negative (Tested in accordance with ISO 10993.)
Genotoxicity	
Systemic acute toxicity	
Implantation test	
Leachable	Tested in accordance with BPOG guideline.
Extractable	

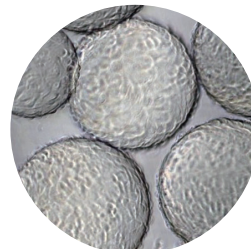


This image shows compression test of PVA Microcarriers

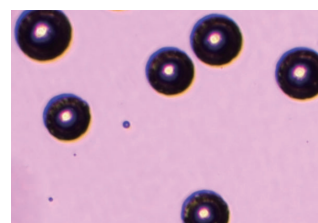
3

Ease of handling

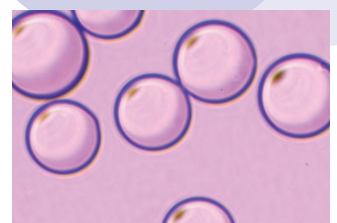
CL type carrier is provided "ready to use." No sterilization or cleaning is required before use. The beads swell quickly in PBS or culture medium and become highly transparent. This allows clear cells observation under a phase-contrast microscope.



High transparency makes it easy to observe cells by microscopy



Immediately after PVA Microcarriers CL is added to the culture medium

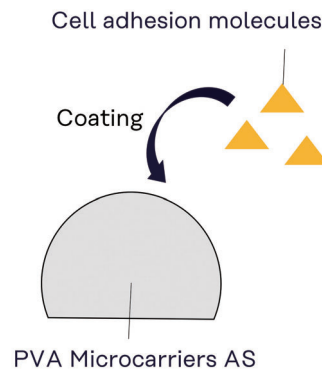


10 seconds after adding culture medium

PVA Microcarriers AS

PVA Microcarriers AS

The particle surface is specially treated and activated.
By activation, any cell adhesion molecules can be coated.



Characteristic of PVA Microcarriers AS

1

Suitable for various cell culture

A wide variety of cells can be cultured by coating with optimal cell-adhesion molecules.

Coating materials tested

Vitronectin / Fibronectin / Laminin / iMatrix-511 / Synthemax®II / Poly-L-lysine / Collagen

2

Animal Origin Free

AS type carrier does not contain any animal-derived materials.

Using recombinant proteins or synthetic peptides, animal-free cell culture can be achieved.

Protocol of coating

AS type carrier needs coating of cell-adhesion molecules before use.
There are two coating methods.

Method

A

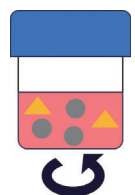
1. Prepare coating solution including cell adhesion molecules.
2. Add coating solution directly to PVA Microcarriers AS in dry condition.
3. Gently mix the dispersion of PVA Microcarriers AS and then wash with PBS.



Method

B

1. Add culture medium and coating material solution into bioreactor.
2. Add AS type carrier into the medium with coating material and mix them.



After coating, the culture procedure is the same as usual. Please contact us for detailed protocols.

Product information of PVA Microcarriers

Product outline

	CL type ▼	AS type ▼
Particle size (D50)	220 μm	160 μm
Surface	Collagen coated	Activated treatment
Swelling factor (in PBS)	10	5
The surface area [/g dry weight]	2,600 cm ²	1,900 cm ²
Sterilization	Gamma irradiation	Gamma irradiation

Approximately 10 uses per 1g for 30 mL culture.

- ※ The actual Particle size and Surface area will be documented in the Result of Analysis.
- ※ PVA Microcarriers is available for research use only. Please contact us for clinical use.

Various cells cultured with PVA Microcarriers

CL type

- hMSC
- human fibroblasts
- VERO cells
- Bovine myoblasts

AS type

- hMSC
- hiPS cells



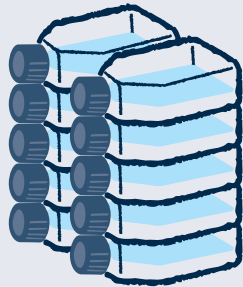
About Microcarriers

Microcarriers are micron-sized beads used as scaffolds for cell culture. Cells attach to the bead surface and proliferate on it.

Cell culture using flasks

- Large space requirements
- High labor demand
- Unsuitable for mass culture

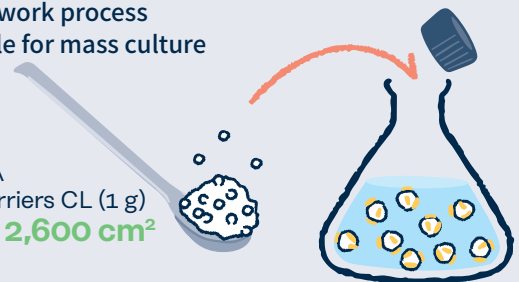
e.g. T175 flasks (10 flasks)
about 1,750 cm²



Cell culture using microcarriers

- Space-saving
- Fewer work process
- Suitable for mass culture

e.g. PVA Microcarriers CL (1 g)
about 2,600 cm²



1

Input

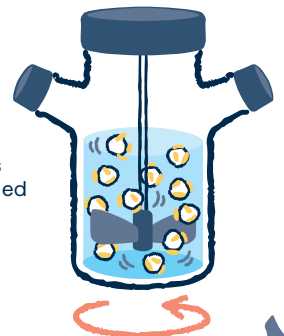
Weigh PVA Microcarriers and put them into culture medium. Any containers, such as flasks and bioreactors, can be used.



2

Cell seeding

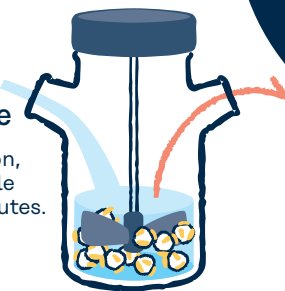
Seed cells and leave it for 24 hours (agitate at determined speed). After that, Agitate at optimal speed.



3

Medium exchange

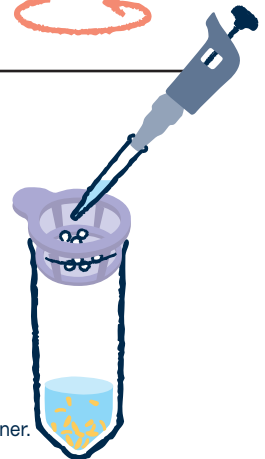
After stopping agitation, PVA Microcarriers settle down within a few minutes. Change half of the medium every 3 or 4 days.



4

Cell harvesting

Detach cells from PVA Microcarriers with Trypsin/EDTA solution. Separate cells and PVA Microcarriers by cell strainer.



How to use Kuraray's PVA Microcarriers

Application notes are available. Please contact below.

Contact us

KURARAY CO., LTD. Life Innovation Business Promotion Division, Functional Materials Company

✉ Contact.LIPG@kuraray.com

🌐 <https://www.kuraray.co.jp/microcarriers/>



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