Automatic Cell Culture System

For Clinical Use

Mesenchymal stem cell
Corneal cells (sheets)
Myoblast

Examples of application (using a prototype)

<table>
<thead>
<tr>
<th>Applicable cells</th>
<th>Adherent cells</th>
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| Operation mode   | Operating time: continuous operation for 24 hours a day, 7 days a week except maintenance period  
|                  | Operating method: unmanned operation by scheduling |
| Culture performance | Maximum 10 incubators  
|                    | Up to 6 flasks can be stored in an incubator |
| Culture operations | Primary culture, medium change, observing cells, subculture, harvesting cells, etc. |
| Compatible vessels | T175 flask/T500 flask/HYPERFlask®  
|                    | 50-mL/225-mL centrifuge tubes |
| Installation environment | Clean class 100,000 (Clean class 100 inside) |
| Dimensions | 6.4 × D 1.65 × H 2.4 (m) (when operated with 4 incubators) |
| Contamination control | Automatic decontamination by vaporized hydrogen peroxide |

Development of this system was supported by the New Energy and Industrial Technology Development Organization (NEDO).

Kawasaki's wide range of technologies contributes to the cell processing for regenerative medicine and cell therapy.

Kawasaki Heavy Industries, Ltd.

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The system is intended for use in clinical research and practice to support advances in regenerative medicine and cell therapy using automated cell culture systems.

**Alternative to cell processing facility (CPF)**

With the automated cell culture system, CPFs with their associated high construction and maintenance costs are no longer necessary. Its installation environment is the same as that for an isolator. With its glove box function, the system can also be used as an isolator. The best configuration for each culture method is achieved by combining the advantages of automated and manual processes.

**Achieving safe, secure and stable large-scale production of cells**

Thanks to automated culture procedures, cells are cultured in a safe, secure and stable way for large-scale production. Culture vessels and other vessels have individual identification systems to prevent errors such as misidentification.

**Recording and monitoring**

As all devices are computer-controlled, all operations of the system, robot movements and the state of cells including their image data are recorded. And its network connection capability enables remote monitoring and remote control.

**Wide varieties of protocols for cell culture can be automated. e.g. Culture of bone marrow mesenchymal stem cell**

- **Loading** - Loading consumable supplies, reagents and bone marrow aspirate into the system
- **Primary culture** - Centrifugation of bone marrow aspirate, removal of heparin and seeding in a T-flask
- **Medium exchange** - Medium is exchanged automatically based on scheduling
- **Cell observation** - Cells can be observed by image processing technology without taking cells outside
- **Subculture** - Subculture from harvesting to seeding is performed
- **Harvesting and delivery** - Cultured cells are harvested and its suspension is delivered

**Contamination control**

With its VHP (Vaporized Hydrogen Peroxide) decontamination function, the system eliminates cross contamination risks when it handles multiple samples from plural donors. It also assures the safety of medical personnel because wastes are disposed of after decontamination.

**High versatility and expandability**

General processes for adherent cell culture are automated. By changing parameters and adding software, the system can be used to culture various types of cells. It can also be used for plural donors and large-scale culture by increasing the number of incubators.

Making Dreams Come True

Alternative to cell processing facility (CPF)

Choosing safe, secure and stable large-scale production of cells

Recording and monitoring

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Use of this system for clinical purposes may require individual application and approval.

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