3P313 マイクロ波照射微生物における至適出力と至適温度 Optimal microwave energy and optimal temperature on microwave irradiated microbial cultivation

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We have utilized microwave heating for cultivating microorganisms. Increase in the number of viable cells and the growth rate was observed by cultivation of *Escherichia coli* under microwave heating. By scanning electron microscopy, the microwave energy sensitivity different from the real temperature had been observed from the shape of the cells. In this study, cultured in a microwave heating *Bacillus subtilis* and *E. coli*, it is compared with normal culture was investigated various temperature and microwave output energy under microwave irradiation condition. As a result, we have confirmed the presence of the optimal microwave output energy for cell cultivation.

3P314 知能ロボットを用いたヒトとのインターフェース Intelligence for Robot-Human Communication

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The intelligence of robot is a key factor in the communication with human being. We study a separate-type arm/hand for disabled persons, with the method to share the cognition: 1) pointing the object by eye-tracker etc, 2) the robot extracts the meaning of the object by its shape by neural network. The robot has a certain intellectual capability to understand the object and execute the demand given by its interpretation. The result indicated that the robot communicates with human by sharing the cognition. The human-human communication could be a model. This study is useful for understanding the nature of communication and modeling the intellectual behavior. The role of the intelligence leads us a reconsideration of the difference between human and robot.

3P315 マイクロ流体デバイスを用いた三次元モデルにおけるグリオーマ幹細胞と分化誘導グリオーマ細胞の浸潤形態比較 Comparing of invasion form between glioma stem cells and the differentiated cells in a microfluidic 3D culture system

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Aims: To investigate the invasion process of glioma, we demonstrated the difference of glioma invasion form and invasiveness between the glioma stem cells and the differentiated cells.

Methods: Microfluidic devices were made by using a soft lithography technique. A mixed-gel solution was injected into a center flow channel. Glioma cells were injected into upper side channel. This invasion process was compared between the stem cells and differentiated cells.

Results and Discussion: We found that stem cells had high invasiveness with single cell invasion form while differentiated cells had low invasiveness with collective cell invasion form. This result suggested that glioma stem cells have a potential to play a role of the leader cell in the process of invasion.

3P316 らせん構造を有する異方性マイクロゲルファイバーの作製と制御 Control synthesis of anisotropic hydrogel microfiber with helical structure

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Hydrogel microfibers have been attracting much attention as soft biocompatible material. The formation method of homogeneous and Janus microfibers has been reported; however, fibers with helical structure cannot be formed by conventional method like microchannels. Here we report a method for the synthesis of anisotropic helical hydrogel microfiber. We used a centrifuge-based fiber extruding device and a centrifugal mixer that generates axial spin and orbital revolution. We constructed a method of controlling diameter and helical pitch of fibers. Furthermore, multiple-helical fibers were also formed successfully. We hope our helical fiber will achieve higher-order functions characteristic of its three-dimensional structure: twisting, expanding and contracting, etc.

3P317 Self-assembly of complex-shaped microgels

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Recently, magnetically functionalized microparticles attract much attention due to their unique properties including self-assembly, and remote controllability with an external magnetic field. Using complex-shaped microparticles, those properties are expected to be extended to self-assembled smart materials, drug delivery, and bioassay, etc. However, only self-assembly using simple-shaped particles (ex. sphere, ellipse, etc.) has been studied up to date. Here, we propose self-assembly of complex-shaped magnetic microparticles (ex. two-thirds of sphere, propeller, etc.) using a magnetic field. We believe that our study will contribute to understanding of dynamic self-assembly of microparticles.

3P318 温度感受性ゲルを用いた蛍光検出によるドロップレットソーティング技術の開発とその応用 Development of fluorescence-activated droplet sorting system using thermoreversible gelation polymer and its application

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We have developed a fluorescence-activated microfluidic droplet sorting system using thermoreversible gelation polymer (TGP) as a switching valve. In this system, water-in-oil droplets are converted into water-in-oil-in-water droplets, hydrodynamically focused by two buffer solutions containing TGP, and actively sorted based on their fluorescence. Using the sorter, fluorescent droplets were separated from non-fluorescent droplets with accuracy and purity better than 90%. As an application of the system, we have demonstrated the isolation of the small subcellular structure (human artificial chromosome; HAC) from crude cell homogenate. Now, we are trying to understand the structure of HAC by mass spectrometry-based proteomic analysis from HAC in collected droplets.