

No 11: Nice living for Susi and her friends



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Apartments for demanding primary tissue cells

Susi, our perty little suspension cell, has hit the jackpot with her relocation to TECNOMOUSE. She loves her new apartment. The supply of nutrient is optimal; the same applies to the disposal of toxic metabolites. And, to cap it all, the air conditioning system provides a good supply of oxygen.

Such ideal living conditions for cell cultures is possible in the TECNOMOUSE apartments, a system of modular cassettes. The hollow fibres of the cassettes (cut-off of 10 kD) are used to recirculate serum-free basic medium through the capillaries. In Susi's extra-capillary apartment, waste products resulting from metabolism are rapidly removed and nutrients supplied via the hollow fibre system. Each apartment can be optimally supplied via a separate ventilating system. Thus, in the case of cell cultures, oxygen supply need no longer be a limiting factor.

Susi's laboratory head is also happy. TECNOMOUSE has already substantially increased the economics of his cell culture laboratory. Now he is even planning to quarter the extremely sensitive primary tissue cells in the TECNOMOUSE apartments. Cultivation of primary tissue cells, however, is generally somewhat complex.

Primary tissue cells that can not adapt to culture conditions suffer particularly under the loss of their normal tissue cell-to-cell contact. The laboratory head knows well how important this cell-to-cell contact is to their survival, reproduction and the production of important growth factors. Susi calls this simply home-sickness on the part of her colleague cells.

Susi, as representative of the cells, is of course informed about the new tenants. The laboratory head had informed her of all the details concerning preparation for the relocation. In our special case this involves removing some bone marrow cells from a patient. These are transferred to a heparinised 10 ml syringe during the operation.

Susi has been watching the preparations for relocation: Adequate amounts of basic medium have been made available, the cassettes have been carefully rinsed with medium and are in the laminar flow bank. Now the future tenants - the sensitive primary tissue cells - are arriving in the laboratory. This is best done with approximately 4×10^8 to 10^9 in approximately 4 ml. In this way, the ideal tissue density can be achieved within the 5 ml volume of the extra-capillary space of the culture cassette immediately subsequent to inoculation. Under laminar flow, they are transferred from the syringe into their new apartment - the extra-capillary space of the cassette. This procedure must be performed extremely carefully as mechanical stress can be fatal for these highly sensitive primary cells. The cassette should be shaken from time to time in order to achieve a good distribution of the cells. This enables them to be introduced rapidly into the culture system.

Over the next few days, the laboratory head spends more time than usual at the incubator watching the cultivation parameters. He wants the new but sensitive tenants to feel at home. For this reason, he regularly checks glucose and lactate concentrations in the medium. In order to monitor the growth of the tenants, he can take samples from the culture chamber at any time without interfering with the rest of the system. Susi need no longer fear that her new colleagues will develop home-sickness.

At the end of the cultivation period, the primary tissue cells can be retrieved almost completely from the cassette. Cell counts, vitality control and other

analysis such as immunoglobulins, CD surface markers and interleukins show that the primary tissue cells have settled in to the hollow fibre apartments in TECNOMOUSE.

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