

# Inhibition effect of carbon micro coils (CMC) for keloid fibroblast (L-929)

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## Abstract

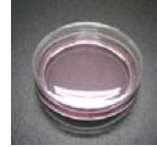
The carbon microcoils (CMCs) have an interesting 3D-helical/spiral structure similar to DNA and have a coil diameter of 1-10  $\mu\text{m}$  and coil length of 0.05-5 mm. The keloid is a benign scar caused by the abnormal breeding of fibroblasts after injury, burn, etc. Many modalities for curing the keloid, such as steroid injection, have been developed. However those modalities are currently not successful. In this work, the CMCs were added to the fibroblast L-929 cells derived from mouse organization in vitro breed to examine the effect for the breeding of the keloid fibroblast. The number of the living L-929 cells after 10 days cultivation was 13% that of the control, with the addition of CMCs, which have potential application as a modality of keloid fibroblasts.



Fig. 1 SEM image of CMC

### Adherent cell

- cell : L-929
- Medium : Eagle's MEM+10%FCS
- cell density :  $1.3 \times 10^4$  cells/ml
- Addition materials :  $0.113 \mu\text{g}/\text{cm}^2$  CMC, Charcoal and Pulverized CMC
- Quantity of total liquid : 6 ml/dish



Tissue culture dish

### 4sample

- Control
  - CMC
  - Charcoal
  - Pulverized CMC
- The cell exfoliated from a tissue culture dish in trypsin  
The cell count used a blood counting chamber

Fig. 2 Culture conditions and method

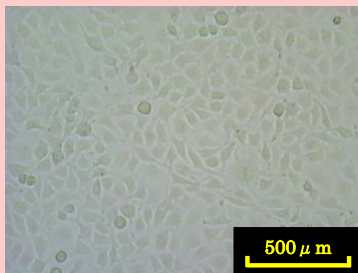


Fig. 3 One day after seeding (control)

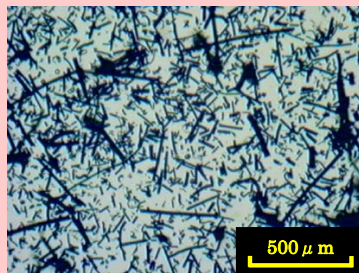


Fig. 4 One day after seeding (CMC added)

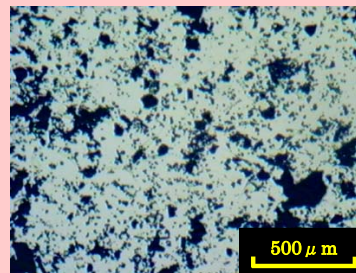


Fig. 5 One day after seeding (charcoal added)

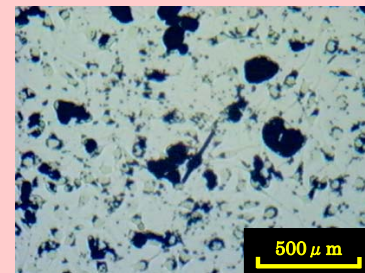


Fig. 6 One day after seeding (pulverized CMC added)

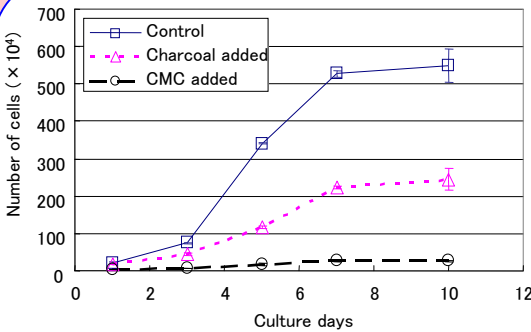


Fig. 7 L-929 cells count measurement (first time)

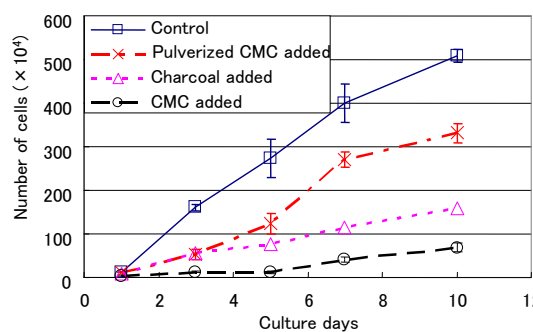


Fig. 8 L-929 cells count measurement (second time)

Table 1 Specific surface area ( $\text{m}^2/\text{g}$ )

CMC	Pulverized CMC	Charcoal
64	93	1426

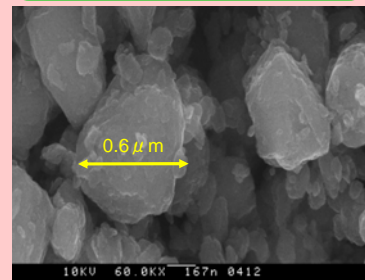


Fig. 9 SEM image of pulverized CMC using ball mills

### Suspension cell

- cell : HL-60 and SP2
- Medium : RPMI1640+10%FCS
- cell density :  $2.7 \times 10^4$  cells/ml
- Addition materials : 0.04wt% CMC and Pulverized CMC
- Quantity of total liquid : 6 ml/flask



Tissue culture flasks

### 3sample

- Control
  - CMC
  - Pulverized CMC
- The cell count used a blood counting chamber

Fig. 10 Culture conditions and method

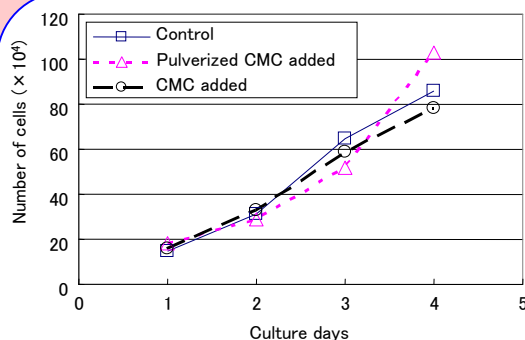


Fig. 11 HL-60 cells count measurement

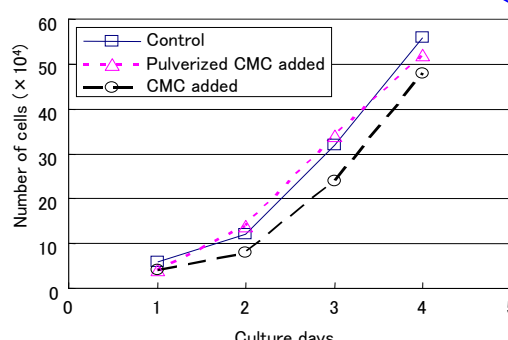


Fig. 12 SP2 cells count measurement

## Conclusion

### For adherent cell

• The number of the living L-929 cells after 10 days cultivation was 13% that of the control, with the addition of CMCs, while the living L-929 cell number for the addition of pulverized CMCs was 65% that of the control.

• This result indicates that the CMCs can effectively suppress the breeding of the L-929 cell.

### For suspension cell

• The effect of CMC was not provided.