

**Effects of Macrophages In Resistance to Murine
Cytomegalovirus Infection**

M. Aminzadeh

Host - defense mechanism to primary viral infection is complex and the factors essential for recovery from the infection are difficult to determine. Among these factors, macrophages have been found to play a significant role in certain viral infection. Numerous studies have demonstrated the importance of the macrophages in host defense against a variety of viral infections(1, 4, 5, 7). The present experiment was undertaken to study the course of murine cytomegalovirus (MCMV) infection in newborn, in 7 and 14 days old CD-1 mice pretreated with macrophages from adult mice.

Materials and Methods

Virus: The Smith strain of MCMV was used in this experiment. The virus was obtained from Armand-Frappier Institute, laval, Canada as lyophilized and it was propagated in primary monolayers of mouse embryonic cells (6). The used virus suspension titre was $10^{5.23}$ TCID ml.

Mice: New born, 7 and 14 days - old CD-1 mice received 0.1ml of macrophages from adult mice. MCMV was given 24 hours later. Control groups received macrophages or MCMV only (4). Each group consisted of 30 animals and injections were given intraperitoneally.

Preparation of Macrophages:

Macrophages were obtained from the peritoneal cavity of CD-1 adult mice(3). Mice were sacrificed, the skin over the abdomen was removed and 3 ml of medium was injected into the intact peritoneal cavity. The fluid was removed into a syringe. This fluid contained approximately 10^6 cells/ml and cultured in vitro for 48 hours in medium RPMI - 1640 containing 10% foetal calf serum, penicillin and streptomycine(5). After 48 hours of culture, macrophages were washed and removed from the plastic flasks with a rubber policeman(2). About 99% of the adhering cells were morphologically identifiable as macrophages after stainings.

Results

Role of the macrophages in resistance to MCMV infection

New born, 7 and 14 days old CD-1 mice were inoculated intraperitoneally with 0.1 ml of macrophages from adult mice at a concentration of 10^6 cells. 24 hours later the mice received 0.1 ml of MCMV intraperitoneally. Control groups received MCMV or Macrophages only. Table 1 shows the mortality was reduced from 100% to 27%.

Table 1
Effects of Macrophages on MCMV infection

| Age of mice (days) | % Mortality | |
|--------------------|---------------------|---------------|
| | Macrophages treated | non - treated |
| 2 | 27 | 100 |
| 7 | 16 | 100 |
| 14 | 0 | 35 |

Discussion

The increased resistance to MCMV of newborn, 7 and 14 days old mice pretreated with adult macrophages suggests that some activities of the macrophages are vital to host defense against MCMV, (7,8).

The effect of macrophages in resistance to MCMV infection could be related to the role of Macrophages in the inductive phase of cellular immunity in treated mice. Further studies, however, is needed to demonstrate the mechanism of the protection.

Summary

In a preliminary experiment, the protective effects of peritoneal macrophages was shown by transferring macrophages from adult mice to newborn and to 7 and 14 days old mice. It was demonstrated that such transplantation protect

suckling mice from intraperitoneal infection with MCMV by reducing the mortality rate from 100% to 27%.

Resumé

La transplantation de macrophages péritoneaux provenant de souris adultes CD-1 protège les souriceaux de 2, 7 et 14 jours contre l'infection par le virus cytomégalique murin.

References

- 1- ALLISON, A.C.: *On the role of mononuclear phagocytes in immunity against viruses. Prog. Med. viral.* 18: 15-31 - 1974.
- 2- AMINZADEH, M, LUSSIER, G, and BOUDREAULT, A: *Effect of anti-mouse macrophage serum on murine cytomegalovirus infection. Rev. Can. Biol., Vol. 35:* 11-16. 1976.
- 3- HIRSCH, M.S., GARY, G.W. and MURPHY, F.A.; *In vitro and in vivo properties of antimacrophage sera. J. Immunol., 102:* 656-661. 1969.
- 4- HIRSCH, M.S., ZISMAN, B. and ALLISON A.C.: *Macrophages and age - dependent resistance to Herpes simplex virus in mice. J. Immunol., 104:* 1160-1165. 1970.
- 5- ISA, AM.: *In vitro specificity and in vivo activity of antimacrophage serum. Transplantation, 17:* 276-280. 1974.
- 6- LUSSIER, G.: *Encephalitis caused by murine cytomegalovirus in newborn and weanling mice. Vet. Path., 10:* 366-374. 1973.
- 7- SELGRADE, M. and OSBORN, J.E.: *Role of macro-*

phages in resistance to murine cytomegalovirus. Infection and Immunity. 10: 1383-1390. 1974.

- 8- ZISMAN, B., HIRSCH, M.S. and ALLISON A.C.: *Selective effects of antimacrophage serum, silica and anti-lymphocyte serum on pathogenesis of Herpes virus infection of young adult mice. J. Immunol., 104:1155-1159. 1970.*