

# Amniotic Membrane Transplantation for Persistent Epithelial Defects and Ulceration due to *Pseudomonas* Keratitis in a Rabbit Model

Mohammad Mehdi Soltan Dallal<sup>1,2</sup>, PhD; Farhad Nikkhahi<sup>3</sup>, PhD; Seyed Mostafa Imeni<sup>4</sup>, PhD  
Saber Molaei<sup>5</sup>, MD; Seyed Kazem Hosseini<sup>6</sup>, MS; Zohreh Kalafi<sup>2</sup>, MS; Sara Sharifi Yazdi<sup>7</sup>, MD  
Hedroosha Molla Agha Mirzaei<sup>8</sup>, MS

<sup>1</sup>Division of Microbiology, Department of Pathobiology, School of Public Health, Tehran University of Medical Sciences (TUMS), Tehran, Iran

<sup>2</sup>Food Microbiology Research Center, Tehran University of Medical Sciences, Tehran, Iran

<sup>3</sup>Medical Microbiology Research Center, Qazvin University of Medical Science, Qazvin, Iran

<sup>4</sup>Biodiversitat, Ecología, Tecnología Ambiental i Alimentaria (BETA Tech Center), (TECNIO Network), U Science Tech, University of Vic-Central University of Catalonia, Carrer de la Laura 13, 08500 Vic, Spain

<sup>5</sup>AJA University of Medical Sciences, Tehran, Iran

<sup>6</sup>Quality Control Manager of Iranian Tissue Bank Research & Preparation Center, Director of Stem Cells Preparation Unit, Tehran University of Medical Sciences, Tehran, Iran

<sup>7</sup>School of Medicine, Tehran University of Medical Sciences (TUMS), Tehran, Iran

<sup>8</sup>Food Microbiology Research Center, Tehran University of Medical Sciences, Tehran, Iran

## ORCID:

Mohammad Mehdi Soltan Dallal: <https://orcid.org/0000-0002-3421-3974>

## Abstract

**Purpose:** The use of amniotic membrane has been suggested in the treatment of infectious keratitis for its intrinsic anti-infective properties probably mediated by its anti-inflammatory effects. The aim of this study was to investigate the effect of amniotic membrane transplantation (AMT) along with ciprofloxacin to cure the primary stages of *Pseudomonas* keratitis.

**Methods:** In total, 28 rabbits were selected and divided in four groups as follows: group 1 as control, group 2 with amniotic membrane, group 3 with ciprofloxacin, and group 4 with amniotic membrane combined with ciprofloxacin. About 0.05 cc suspension of *Pseudomonas aeruginosa*, 27853 ATCC was injected into corneal stroma.

**Results:** The results showed groups of AMT, AMT + ciprofloxacin, and ciprofloxacin had 0% perforation while the control group had 85.6%. Average infiltration of 5.5 mm was observed in ciprofloxacin group, 5 mm in AMT + ciprofloxacin group, 24 mm in AMT group, and finally 23.75 mm for control. Amniotic membrane showed to be effective in prevention of cornea perforation as well as remission of *Pseudomonas* keratitis. There was no significant difference between ciprofloxacin groups in comparison with ciprofloxacin + AMT group. However, regarding the anti-inflammatory effect, the process of improvement of inflammation in ciprofloxacin + AMT group was faster.

**Conclusion:** Transplantation of amniotic membrane in the primary stages of *Pseudomonas* keratitis treatment remarkably prevents the disease and it can be used to control its process.

**Keywords:** Ciprofloxacin; Human Amniotic Membrane; Keratitis; *Pseudomonas aeruginosa*; Rabbit