Role of Erythrophagocytosis in Free-Living Amoebae

Shibayama M[1]., Silva-Olivares A[1]., Gonzalez S[2]., Tsutsumi V[1]. Departamento de Patología Experimental[1] and Unidad de Microscopia Electrónica[2], CINVESTAV-IPN, Mexico D.F. E-mail: mineko@cinvestav.mx

Free-living amoebae of the genus *Acanthamoeba* are ubiquitously distributed in soil, water, dust, air, domestic tap water, contact lenses and lens cases. Recent medical interests in these amoebae have focused mainly on the capacity of some specific strains to produce amoebic granulomatous encephalitis and amoebic keratitis. Several mechanisms contributing on the pathogenesis of these diseases have been reported and include mainly three aspects: cytolisis, apoptosis and phagocytosis. However, the role of erythrophagocytosis in free-living amoebae has been studied very little. The aim of the present study was to determine the possible role of phagocytosis in the pathology of two common species of *Acanthamoebae* isolates obtained from human keratitis, *Acantahamoeba castellanii* and *A. polyphaga.* We interacted human erythrocytes type AB Rh+ ($50x10^6$/0.2 ml) with $1x10^6$ trophozoites of *Acantahamoeba spp*. The interactions were performed in 24 well-plastic culture dishes at different times (30, 60 and 120 min) at 30ºC. After interactions, samples were centrifuged and the pellets were fixed with 2.5% glutaraldehyde in cacodylate buffer and processed for transmission electron microscopy. Ultrathin sections were contrasted with uranyl acetate and lead citrate and examined with a Jeol 100SX TEM. Results showed that at 30 min, undamaged cell membranes of erythrocytes and trophozoites were closely apposed each other. At sixty minutes, we observed trophozoite cytoplasmic changes characterized by a partial or total engulfment of the red blood cells. After two hours of interaction, we observed erythrocytes in different stages of degradation inside the phagocytic vacuoles of *Acanthamoeba* trophozoites. The phagocytic indexes of *A. castellanii* and *A. polyphaga* were around 5% and 15%, respectively. Based in our results we suggest that the erythrophagocytic process does not constitute a relevant mechanism on the pathogenesis of *Acanthamoeba spp* and probably may form part of biochemical metabolism in *Acantahmoeba* species.

References

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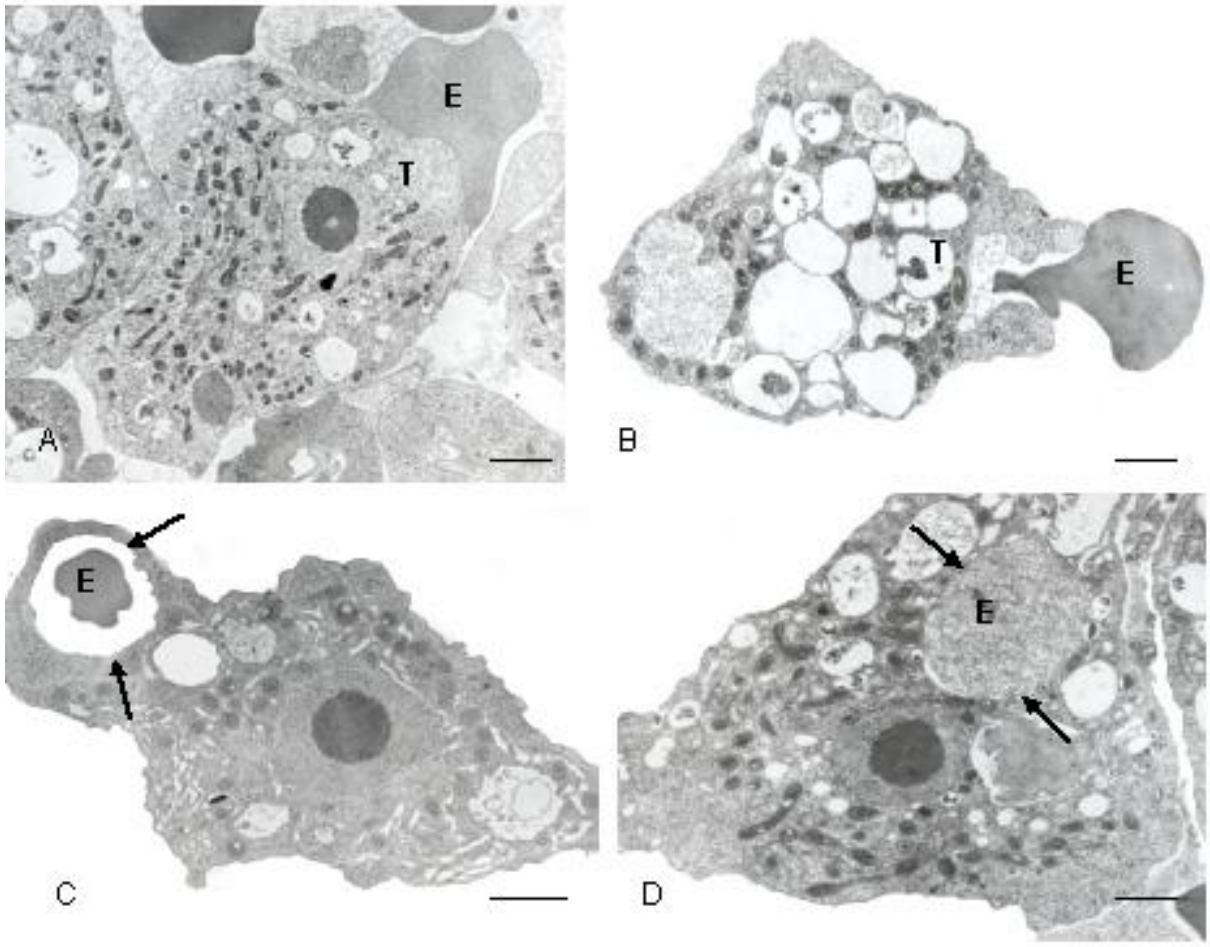

Figure 1. (A) *Acanthamoeba castellani* interaction with erythrocytes. Cell membranes of erythrocytes (E) and trophozoites (T) are in closed contact. (B) *Acanthamoeba polyphaga.* A partial engulfment of the red blood cell (E) by the trophozoites (T) is seen. (C and D) Erythrocytes (E) in different stages of degradation inside the phagocytic vacuoles (arrows) of *Acanthamoeba castellanii* are shown. (Bars = 0.5 μm).