Morphology of *Chlamydia trachomatis* using Transmission Electron Microscopy

Shamala Moodley  
Dept of Biomedical Sciences, Mangosuthu University of Technology, KZN, SA

In a Transmission Electron Microscope (TEM) energised electrons are used to highlight the morphology and composition on samples under test. With a potential magnification of 1 nanometre, and a high resolution, two dimensional images are produced thereby allowing for a wide range of applications in both science and technology. TEM consists of the following components: an electron source, thermionic gun, electron beam, electromagnetic lenses, vacuum chamber, two condensers, a sample stage, a fluorescent/phosphor screen and a computer. The basic principal is similar to an optical microscope, however in TEM the photons are replaced by electrons with electromagnetic lenses whilst the images are viewed under a screen projected onto the computer screen. For TEM analysis, samples need to be sliced thin enough for electrons to pass through. The principal of transmission occurs as follows: the speed of electrons is directly correlated to the wavelength of the electron which produces the quality and detail of the image. The lighter areas represent an area of a greater number of electrons passing through the sample and the darker areas reflect the dense areas of the sample. With these differences, information on the structure, texture, shape and size of the sample is provided.

Using the principal of TEM, a study of the life cycle of the organism *Chlamydia trachomatis* was undertaken. Comparison of the structures of *C trachomatis*, scanned by TEM and light microscopy, was investigated. McCoy cell line monolayers were prepared and co-cultivated with *C trachomatis*. Samples were collected and processed for the presence of *C trachomatis* using an iodine stain technique. Similar samples were prepared for transmission electron microscopy (TEM). Prepared slides from samples incubated at 24, 48, 60 and 72 hours post infection were viewed and data was documented. All electron microscopy samples were prepared using the following technique: cryofixation, fixation, dehydration, embedding, sectioning, staining, freeze-etch and sputter coating. TEM produced a high-resolution, black and white image from the interaction with prepared samples. The developmental process of *C trachomatis* using TEM was compared to that using light microscopy. The findings suggested that the co-infected McCoy cells with *C trachomatis* was detectable intracellular in parallel cultures viewed by using light microscopy and TEM. In both TEM and light microscopy observation of infected cells revealed that the developmental cycle of the organism corresponded at 24, 48, 60 and 72 hours post infection.

**Key words:** TEM technique, *C trachomatis*, McCoy cells, tissue culture, electromagnetic lens

**References**