

Internal Ultrastructure of Human Chromosomes

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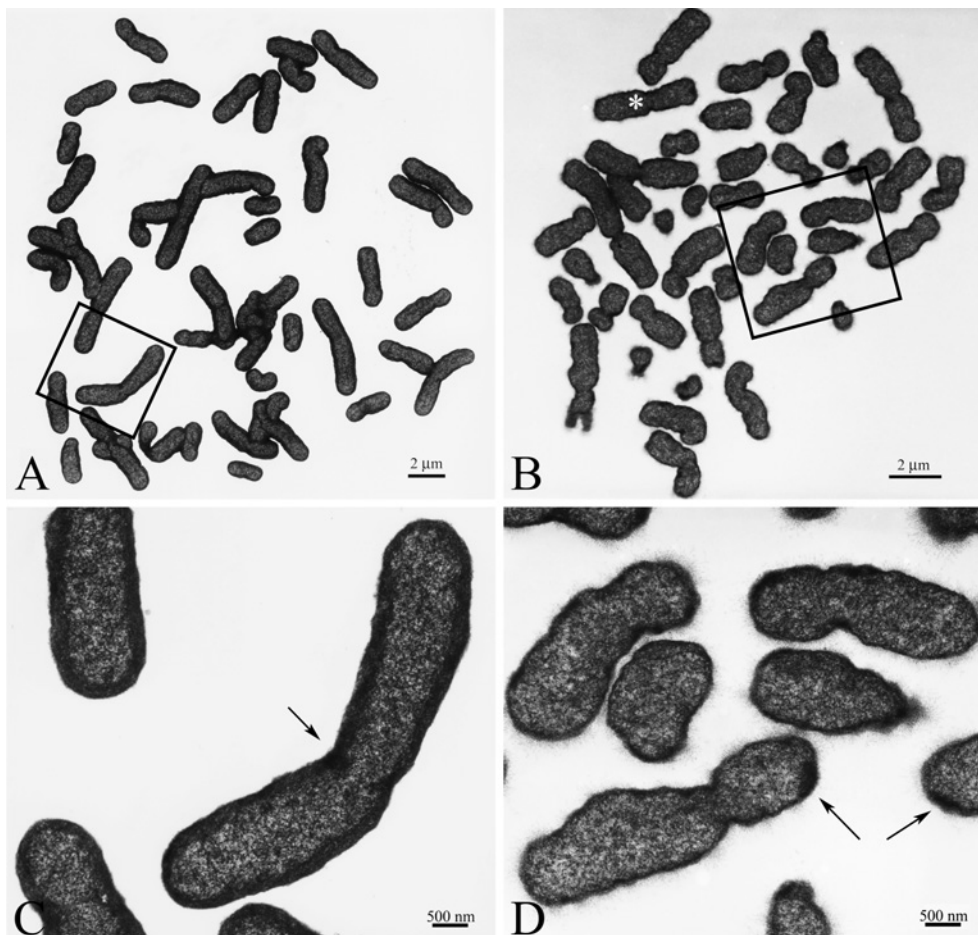


Fig. 1

Abstract

By preparing metaphase chromosome spreads on Aclar[®] (polychlorotrifluoroethylene fluoropolymer) film and incorporating a conventional karyotyping system, it was possible to observe the internal ultrastructure of individual chromosomes with known karyotype by means of transmission electron microscopy. Essentially, all 46 chromosomes per human cell could be examined. Application of this method to chromosome research may provide comprehensive information on ultrastructural morphology of chromosomes from various cell types and on the fine structure of different chromosomal regions in relation to function.

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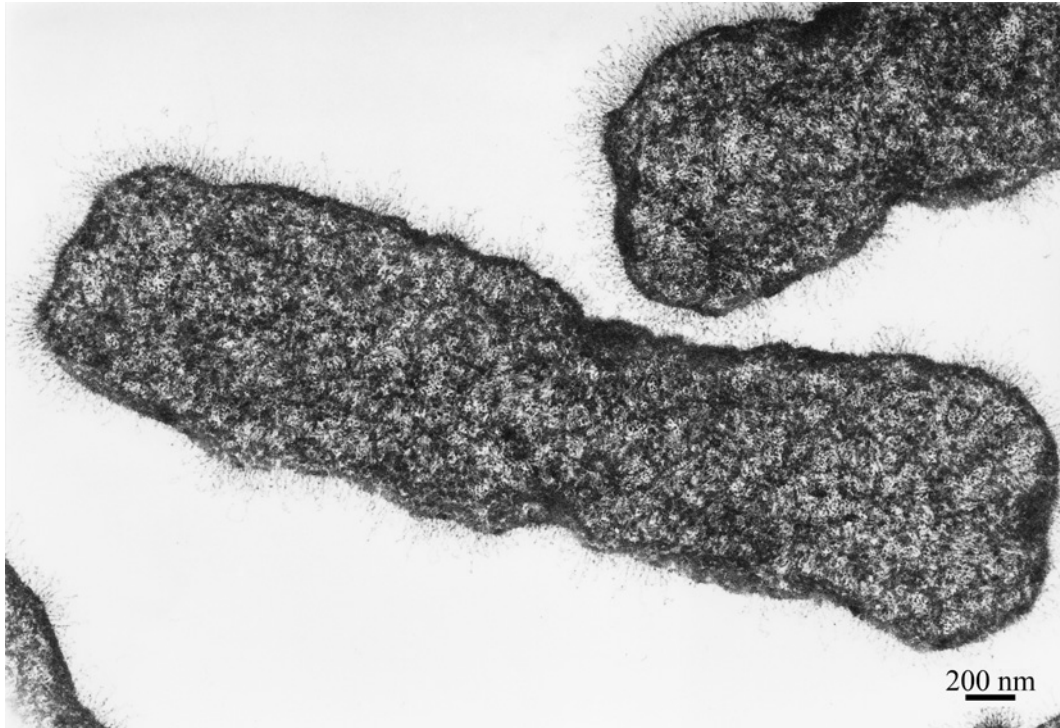


Fig. 2

Fig. 1 (A) Internal ultrastructure of the longitudinal section of metaphase chromosomes from normal human lymphocytes shows uniform axial thicknesses and regular boundaries¹. (B) Metaphase chromosomes from the human ovarian carcinoma cell line (A2780) show variable axial thicknesses and irregular boundaries. (C, D) High magnification views of the rectangular areas in **Figure 1A** and **Figure 1B**, respectively, show (C) lymphocyte chromosomes with regular, thick, electron dense boundaries and a relatively less dense interior region and a constriction at the centromere region (**arrow**) and (D) chromosomes from ovarian carcinoma cells with irregular, thin, electron dense boundaries and electron condensations at the distal ends of the short and long arms (**arrows**). Also, abundant extended chromatin loops at the outermost boundaries are seen.

Fig. 2 High magnification view of the chromosome identified by asterisk in **Figure 1B** clearly shows the internal ultrastructure, the pattern of chromatin condensation at the boundary and interior region, and extended chromatin loops at the outermost boundary.

Reference

1. Ghazizadeh M, Sasaki Y, Oguro T, et al.: A novel technique for observing the internal ultrastructure of human chromosomes with known karyotype. *Microsc Microanal* 2008; 14: 357-361.