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Electromagnetic Biology and Medicine (formerly Electro- and Magnetobiology)

Publisher: Taylor & Francis**Issue:** Volume 20, Number 1 / 2001**Pages:** 75 - 80**URL:** [Linking Options](#)**DOI:** 10.1081/JBC-100103161**MICROTUBULES IN BIOLOGICAL CELLS AS CIRCULAR WAVEGUIDES AND RESONATORS**František Jelínek ^{A1} and Jiří Pokorný ^{A2}^{A1} Institute of Radio Engineering and Electronics, Academy of Sciences of the Czech Republic, Chaberská 57, 182 51 Prague 8, Czech Republic^{A2} Institute of Radio Engineering and Electronics, Academy of Sciences of the Czech Republic, Chaberská 57, 182 51 Prague 8, Czech Republic**Abstract:**

The microtubules in the cellular cytoskeleton have a fundamental role in the living processes of biological cells. They are hollow cylinders which resemble circular waveguides or cylindrical resonators. The cutoff and resonant frequencies of the transverse magnetic and transverse electric modes of the microtubule cavities are in the band of soft x-rays. This suggests the possibility of interaction of electromagnetic cavity modes with inner electrons in atoms (e.g., in carbon, nitrogen, and oxygen). Biological cells (e.g., the yeast cells of spherical shape) may also represent cavity resonators. In this case, the resonant frequencies may be in the infrared region.

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