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The stimulatory effects of caffeine, theophylline, lysine-theophylline and 3-isobutyl-1-methylxanthine on human sperm motility

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The potencies of caffeine, theophylline, lysine-theophylline and 3-isobutyl-1-methylxanthine (IBMX) in stimulating sperm motility have been compared, and we have found IBMX to be significantly more potent than the other three compounds, which did not exhibit significant differences in potency from each other.

Keywords sperm motility caffeine theophylline IBMX

Introduction

Methylxanthines such as caffeine and theophylline increase sperm motility (Burge, 1973; De Turner *et al.*, 1978; Garbers *et al.*, 1971; Haesungcharern & Chulavatnatol, 1973; Hicks *et al.*, 1972; Levin *et al.*, 1980; Makler *et al.*, 1980; Schoenfield *et al.*, 1973). This effect has been attributed to their potent phosphodiesterase (PDE) inhibitory action and elevation of adenosine 3'5-cyclic monophosphate (cAMP) levels within the sperm, following inhibition of cAMP-PDE (Tash & Means, 1983). We have measured the effects of theophylline and caffeine at stimulating sperm motility and compared them with IBMX and lysine-theophylline. IBMX exhibits a higher degree of PDE inhibitory activity than either caffeine or theophylline (Davis & Kuo, 1977; Glass & Moore, 1978; Helfman & Kuo, 1982) and lysine-theophylline is a more soluble theophylline preparation with a pharmacokinetic profile after oral administration almost identical to that of aminophylline in normal subjects (Johnston *et al.*, 1983).