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Conjugal Transfer of Antibiotic Resistance Plasmid of Different Bacterial Species Isolated from Patients Suffering from Diarrhea

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ABSTRACT

The transfer ability of antibiotic resistance plasmid DNA in the bacterial species *Escherichia coli, Klebsiella oxytoca, Salmonella spp., Enterobacter cloacae and Morganella morganii* which previously isolated from patients suffering from diarrhea, has been examined via conjugation. Plasmid DNA from the first four species carrying resistance for ampicilin, chloramphenicol, gentamycin, erythromycin and tetracycline and for heavy metals (mercury chloride, cadmium chloride and silver nitrate) was found capable of transfer to the laboratory *E. coil* strain (JM83) by conjugation which became resistant to these antibiotics and drugs The plasmid DNA transfer has been confirmed by analyzing the plasmid DNA content of the JM83 transconjugant colonies using agarose gel electrophoresis where the plasmid profile revealed the existence of the transferred DNA plasmid in the recipient JM83cells.

الانتقال الاقتراني لبلازميدات المقاومة للمضادات الحيوية في أنواع من البكتريا المعزولة من الأشخاص الذين يعانون من الإسهال

الملخص

اختبرت قابلية انتقال البلازميدات مانحة المقاومة للمضادات الحيوية قي الانواع الجرثوميـة التـي سبق عزلها (*Escherichia coli, Klebsiella oxytoca, Salmonella spp. , Enterobacter cloacae and Morganella morganii*) من المرضى المصابين بالاسهال، اظهرت النتائج ان البلازميدات في الأنواع الجرثومية الأربعة الأولى والتي تمـنح المقاومـة للأمبـسلين للكلورامفينيكـول، جنتامايـسين، ارثرومايسين، تتراسايكلين وكذلك للمعادن الثقيلة (كلوريد الزئبق، كلوريد الكدميوم ونترات الفـضة) لهـا المقدرة على الانتقال الى السلالة المختبرية *E. coli* (JM83) بوساطة الاقتـران مانحـة هـذه الـسلاله المقاومة للمضادات اعلاه بعد ان كانت حساسة لها. أن أنتقال ال DNA اللبلازميدي قد تم دعمـه وذلـك بأجراء تقنية الترحيل الكهربائي لنماذج من محتوى ال DNA البلازميدي المعـزول مـن المـستعمرات

الجرثومية المقترنة للسلالة (JM83) بأستخدام هلام الأكروز و تبين وجود DNA اللبلازميدي المنقول في خلايا سلالة (JM83) المستقبله.

INTRODUCTION

The discovery of self transmissible resistance elements (R- factor or R-plasmids) made the study of conjugation become fused to the increasing interest in the emergence of multiple antibiotics resistance. The number of different R-plasmids isolated increased rapidly and variations in their properties become apparent (Stuttard and Rozee, 1980). Many plasmids have a narrow host range, transferring only intra and inter specifically. Others are capable of intergeneric transfer. Initially intergeneric transfer studies concentrated on the *Enterobacteriaceae*, but have since been extended to other genera, e.g. *Pseudomonas* and *Rhizobium* (Schaberg and Zervos, 1986).

Conjugation is considered as a major pathway for horizontal (or lateral) gene transfer among bacteria. Conjugation requires cell-to- cell contact and operates by DNA replication resulting in unidirectional transfer of genetic material from a donar to a recipient cell. It is mediated mainly by conjugative plasmids, although conjugative transposons are also capable of triggering the process of conjugation (Dionsio et al., 2002). Two aspects of conjugative plasmids have contributed to their importance as mediators of DNA transfer. First, it has been observed that conjugation plasmids mediate gene transfer in various environments such as soil and rhizosphere, or human gut. Second, conjugative plasmids are highly promiscuous; donar and recipient cells may belong to different genera or even to different kingdoms. A conjugative plasmid can infect different bacterial species if they coexist in the same habitat because conjugation requires contact between donar and recipient cells (Berg, 1996)

Conjugation is most easily demonstrated amongst members of the Enterobacteriaceae and other Gram-negative bacteria (such as *Vibrios* and *Pseudomonas*). Several genera of Gram- positive bacteria possess reasonably well-characterized conjugation systems : these include