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A QUANTITATIVE COMPARISON OF PURINOCEPTORS IN HUMAN FETAL AND ADULT BLADDER

### Introduction

Human fetal bladder innervation has only been studied to a limited extent and although there is evidence that ATP acts as a co-transmitter in adult human bladder via the P2X receptors it remains undetermined whether these play a role in the developing bladder.

### Methods

TaqMan RT-PCR provides a system for the detection and analysis of RNA. Five complete post-mortem fetal bladders were obtained at 16 weeks to full-term and divided into segments (n=12). Adult bladder samples were obtained from patients requiring bladder biopsy (n=4). Total RNA was extracted from each sample and 10ng of this used for individual PCR reactions. An ABI 7700 machine determined expression levels of the seven P2X genes/ng of total RNA.

### Results

In adult bladder, P2X1 was by far the predominant purinergic receptor at the RNA level, the remainder consistently present in the order P2X1>>P2X4>P2X7>>P2X5>P2X2>>P2X3=P2X6=0. In fetal bladder the expression of P2X1 was much lower than in adult bladder; P2X4 and P2X7 were also present predominantly in the order P2X1=P2X4>P2X7>>P2X5>>P2X2>>P2X3=P2X6=0. Also P2X1 expression migrated from being situated predominantly in the dome early in gestation to the body of the bladder towards term.

### Conclusion

P2X1 is the predominant receptor subtype in the adult human bladder. There is a distinct difference in P2X expression profile between fetal and adult human bladder. The most striking being that P2X1 is expressed at a much lower level in the fetal compared with adult bladder. Since a fetus does not need to micturate in the same way as an adult does, P2X1 is not needed during the development of the bladder.