$GABA_A$ receptor subunit composition in cultured hippocampal neurons from newborn rats

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$GABA_A$ receptors are the major inhibitory neurotransmitter receptors in the central nervous system. These heteromeric receptors are composed of five subunits and so far six, α-, three β-, three γ-, one δ-, one ε-, one π- and one θ- subunit have been identified in the mammalian nervous system. A number of pharmacologically important drugs such as benzodiazepines, barbiturates, anaesthetics and convulsants produce at least part of their clinically relevant effects by directly binding to $GABA_A$ receptors. These drugs exert their effects by changing channel kinetics or channel conductance, or both. The generally reported conductance for synaptic $GABA_A$ receptors is 25-30 pS. We have reported much higher conductances of up to 100 pS, and an increase in conductance in the presence of some of the above drugs, in cultured hippocampal neurons from newborn rats (Eghbali *et al.*, 1997). A possible reason for the discrepancy between our results and those of some others is that cultured neurons from newborn rats may have an unusual complement of subunits. Our aim is to identify the subunit composition of $GABA_A$ receptors in these neurons by reverse transcriptase PCR (RT-PCR) in seven-day-old hippocampal cultures from newborn Wistar rats. In initial work, we are concentrating on the main subunits: α, β, γ and δ. Our preliminary results show an absence or a very low quantity of α-1 and 6, β-2, γ-2 and -3 in these cultured cells.

Eghbali, M., Curmi, J.P., Birnir, B. & Gage, P.W. (1997) *Nature,* 388:71-75.