Apolipoprotein E (APOE) is a protein that plays an important role in cholesterol transportation. APOE e4 is well established as a risk factor for Alzheimer's disease. ApoE e4 is deficient cholinergic activity (Poirier et al., 1995, Arendt et al., 1997), so studying nicotine effects might lead to e4-specific therapies.

**Aims**
- Further explore compensation vs efficiency hypotheses, imaging a Prospective Memory (PM) task in young adult e4 and e3 carriers.

**Methods**
- 40 volunteers aged 18-28, 20 e4s and 20 e3s, groups matched on IQ and episodic memory performance.

**Practice ongoing task**
- Self administer nasal spray, then receive PM instruction
- Perform PM task while plasma levels at max (~18 mins after spray)

**Results**

**Behaviour**
- • No effects of genotype/drug on PM accuracy, but there was a significant drug x genotype interaction on PM RT (F(1,36) = 4.60, p = .04).
- • No accuracy/RT advantage for e4, but e4s were advantaged by nicotine, while e3s were not.
- • Greater Hipp activation under Nic in e4s, on PM trials.
- • Two anterior regions of medial BA10 showed modulation by PM RT (p<0.05 FWE-corrected).
- • Positive relationship implies deactivation driven faster responding.

**Summary and Discussion**
- • Nicotine enhanced prospective memory performance in APOE E4 carriers: an fMRI study.