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**Brain power**

The brain produces

**1,000 trillion**

calculations per second

A super-computer would need the energy of a small nuclear power station to achieve this



Yet the brain consumes only

**30**

watts of power



equivalent to a desktop PC or monitor on standby



# Turn left at the cortex: scientists map entire brain

■ **Jonathan Leake**

BRAIN researchers are planning the world's most ambitious scientific collaboration to date – to map the human brain down to each neuron and the molecules that make them work.

Eighty universities and research centres from 22 European Union countries will work with others in America, Japan and China on the 10-year "Brainome" project, which is due to be announced at the American Association for the Advancement of Science today.

One key aim is to develop a new and far deeper understanding of the factors that control intelligence, personality and the risk of mental illness.

Another is to use the knowledge gained to design new computers that can match the human brain's enormous processing power and low energy consumption.

Karlheinz Meier of Heidelberg University in Germany, a leading researcher on "neuromorphic computing" – the term for systems that mimic the brain – said: "The brain has the ability to efficiently perform computations that are impossible even for the most powerful computers – while consuming only 30 watts of power."

Such a computer is years away: to match the brain it would have to be capable of performing a billion billion calculations a second.

The three key organisations at the heart of the Brainome are the Human Brain Project, which is creating a "virtual brain" housed in a super-computer near Düsseldorf; the Allen Institute for Brain Science in Seattle, which is trying to map the cortex, the seat of consciousness and reasoning; and Harvard University's brain research through advancing innovative neurotechnologies initiative.