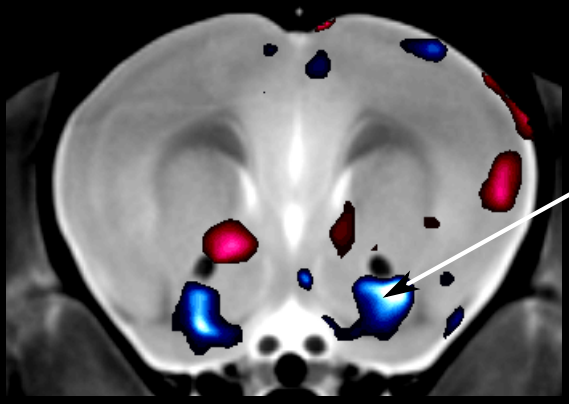
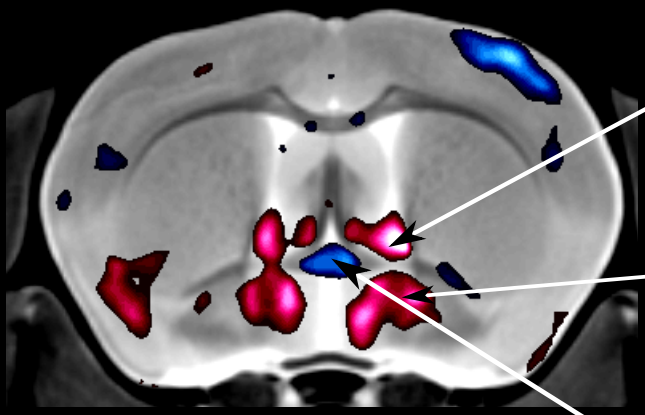
Sex Differences in the Brain as seen by MRI



Nucleus Accumbens: part of the ventral striatum, whose function is primarily related to motivation and reward. There is a large amount of literature on sex differences in addiction, though not much is known about anatomical differences in the accumbens. A recent study (Forlano and Woolley, 2010) suggests that females have more dendritic spines and that those spines are larger, which corresponds well to the volume increases shown here.

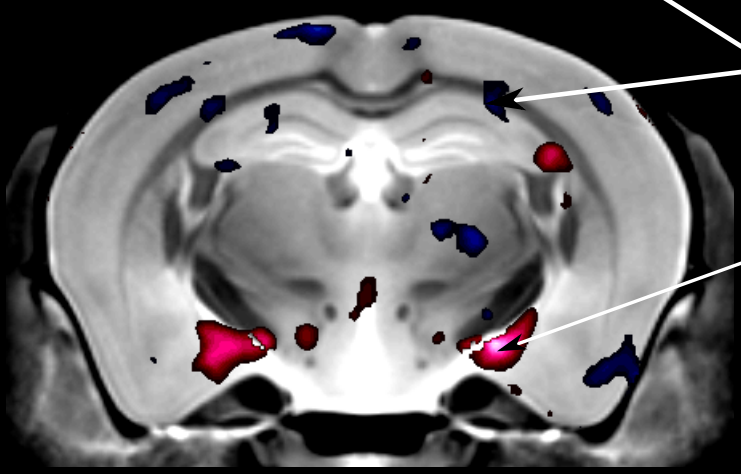
Male > Female



Bed Nucleus of the Stria Terminalis (BNST): one of the best known sexually dimorphic regions of the brain is also the most significant in our MRI results. The BNST is tightly interconnected with the amygdala and the hypothalamus and is involved in the control of sexual behaviour, gonadotrophic release, stress and anxiety.

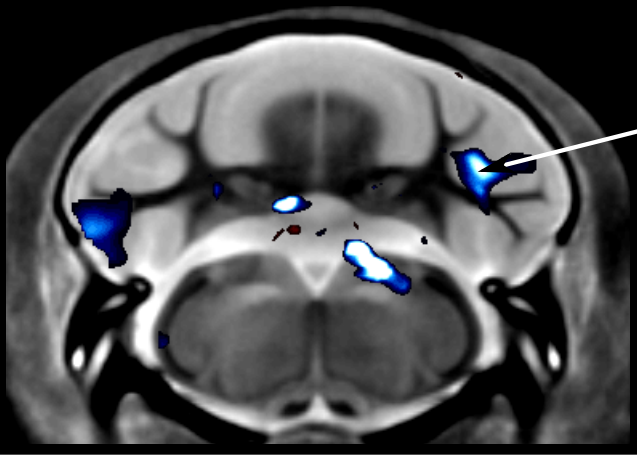
Hypothalamus: the hypothalamus is involved in functions related to survival and reproduction; multiple hypothalamic nuclei are known to be sexually dimorphic.

Female > Male



White matter: the corpus callosum has long been known to be larger in females; here too we find increases in volume in the corpus callosum as well as in the anterior commissure.

Amygdala: the amygdala is central to fear , anxiety, and emotion processing in the brain. The medial nuclei of the amygdala are particularly sexually dimorphic in our results.



Cerebellum: the cerebellum has classically been implicated in motor coordination, though recently its role in higher cognitive functions is becoming clear. Little is known about sexual dimorphisms in cerebellar anatomy; our finding that female mice have multiple enlarged regions in the cerebellar folia is thus particularly intriguing.