**Introduction**

- Several psychiatric disorders (e.g., OCD) that are common in human populations have not been identified in any other animal.
- Rhesus monkeys, a species that is frequently used in neurophysiology research, could be useful as models of psychiatric disorders given their rich and variable behavioral expression.
- As part of a research program to understand OCD and related disorders, we have identified extremes in abnormal behavioral patterns exhibited by captive rhesus monkeys.
- We used whole-brain (PET) imaging and quantitative video analysis to assess similarities with psychiatric disorders along specific observable behavioral dimensions.
- This approach could yield new insights into the neural mechanisms of psychiatric disorders.
- It could also provide a platform with which to explore and refine neurotherapeutic treatments, especially deep brain stimulation, and other technologies that could benefit from basic research in non-human primate neurophysiology.

**Methods**

- Animal behaviors are continually observed and assessed by animal facility staff and members of the MGH CCM. Abnormal behaviors (e.g., repetitive behavior, self-injurious behavior) are systematically documented as part of an enrichment/well-being program.
- Four male rhesus monkeys (Macaca mulatta) expressing abnormal behaviors and four normal controls underwent Fludeoxyglucose positron expressing abnormal behaviors and four normal controls underwent Fludeoxyglucose positron imaging (FDG-PET).
- PET imaging of rhesus monkeys with (obsessive compulsive disorder) OCD-like behaviors

**Behavioral Assessment of monkeys**

- In OCD, compulsive behaviors are typically performed to mollify anxiety associated with obsessions. The Yale-Brown Obsessive-Compulsive Scale (YBOCS) is used to measure the severity of the OCD, specifically:
  - Time occupied by obsessions/compulsions
  - Interference due to obsessions/compulsions
  - Resistance against obsessions/compulsions
  - Degree of control over obsessions/compulsions

Some common compulsive behaviors include repetitive cleaning, hand-washing, checking locks and touching objects. Excessive hair-pulling (trichotillomania) is often characterized within the OCD spectrum.

**FDG-PET of OCD-like Monkey**

- NHP-3: 5 years old (Arrival 4/2010)
- NHP-4: 1.5 years old (Arrival 2010)
- NHP-5: 5 years old (Arrival 4/2010)
- NHP-6: 5 years old (Arrival 4/2010)
- NHP-7: 5 years old (Arrival 4/2010)
- NHP-8: 5 years old (housed since 2008)

**Relating Stereotypes to OCD**

- Self-injurious behaviors such as Trichotillomania (compulsive hair pulling) are often characterized within the OCD spectrum.
- 80-80% of people with trichotillomania have a comorbid psychiatric disorder such as anxiety, depression, or OCD (Feuer et al. 2010).
- Trichotillomania has been observed in animals when they are exposed to environmental stressors (Mejido et al. 2010). The Institute for Laboratory Animal Research considers hair pulling a “maladaptive behavior” that soothes over the stress from chronic confinements. (Reinhardt V. 2005)

**Summary**

These results suggest that some non-human primates that spontaneously exhibit abnormal behaviors could be a useful model for human OCD, since they share a common endophenotype. This would be an important and timely result in light of the recent humanitarian device exemption granted by the FDA for the application of deep brain stimulation for treatment-refractory OCD. Studies in a viable non-human primate model for OCD could systematically explore treatment parameters to maximize therapeutic benefit for OCD-like symptoms in monkeys and then be applied to humans with related OCD symptoms.