Does oxytocin facilitate social cognition in adults with ASD?

Specific deficits in social cognition have been observed:

Individuals with autism spectrum disorders (ASD) show deficits in:

- Non-verbal behaviors (e.g., eye-contact, social smiling);
- Developing appropriate peer relationships;
- Sharing enjoyment;
- Social and emotional reciprocity, and empathy;

Moreover, parent reports indicate that individuals with autism prefer to stay isolated, miss social cues, and do not seem to recognize others.

Specific deficits in social cognition have been observed:

- Face recognition (Szatmari et al, 1990; Davies et al, 1994; Barton, 2003);
- Recognition of facial expressions (Hobson, 1987; Tantam et al, 1989); and
  - Affective speech comprehension (Hobson et al 1989).

Research with rodents suggests that oxytocin (OT) may play a role in social recognition:

- Oxytocin receptor antagonist inhibits social recognition in female rats (Engelmann et al, 1998);
- Oxytocin facilitates affiliation through its role in social recognition:
  - Female pair-bond formation, separation distress, and other behaviors, including sexual behavior, mother-infant and male-female pair-bond formation, separation distress, and other aspects of social attachment.

This study sought to investigate whether oxytocin is involved in aspects of human social cognition.

Autism presents a unique opportunity to examine the functional link between oxytocin and social cognition because deficits in social functioning and social cognition are core features of this disorder.

This study sought to investigate whether oxytocin (OT) may in part facilitate affiliation through its role in social recognition:

- Central OT admin. facilitates social memory in rodents (Popik et al 1992);
- OT receptor antagonist inhibits social recognition in female rats (Engelmann et al, 1998);
- OT “knockout” mice fail to recognize a conspecific over 2+ encounters (Ferguson et al, 2000);
- Social recognition in OT knockout mice can be rescued by bilateral microinjections of OT into medial amygdala prior to initial encounter (Ferguson et al, 2001).

This study sought to investigate whether oxytocin (OT) may in part facilitate affiliation through its role in social recognition:

PROCEDURE:

- Each participant served as his/her own experimental control;
- Participants randomized in a double-blind fashion to receive oxytocin and placebo challenges on separate days (delay: M=16; SD=14);
- Infusion order counterbalanced;
- Challenge began at 9:00 am following overnight fast;
- Oxytocin/placebo infused continuously over a 4-hr period;
- Initial infusion rate was 10 ml/hr to minimize potential side effects, and was gradually titrated up to 700 ml/hr during the 4th hour.

COMPREHENSION OF AFFECTIVE SPEECH:

- Participants presented with 4 pre-recorded sentences of neutral semantic content (e.g., “the boy went to the store”);
- Each sentence presented twice in one of four emotional intonations (happy, sad, angry, indifferent);
- Pairing of sentences and emotional expression in 1 of 6 counterbalanced orders;
- Tested at baseline and at 30, 60, 90, 180, 240 min. throughout infusion;
- Dichotomously scored as 1 (all items correct) and 0 (not all items correct) because of negative skew.

RESULTS:

- Mixed regression analysis used to model change in speech comprehension scores over time;
- Significant Time x Treatment x Order interaction for the dichotomized comprehension of affective speech score (z = -2.134, p = 0.033, estimate = -0.170) (Figure 1);
- Difference between predicted pretest scores for participants receiving placebo 1st (0.958) and placebo 2nd (0.712) was 0.246, corresponding to a medium to large effect size (δ) of 0.66;
- Controlling for delay between infusions did not alter results.

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Contact information: jbebhar@msm.edu