Hormonal Dysregulation as a Risk Factor for Depression in Early Adulthood

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Introduction

Cortisol is a steroid hormone that increases during stress to mobilize energy. Both blunted and elevated cortisol responses to stress have been associated with depression.

Progesterone, another steroid hormone, has been associated with social affiliation and bonding. Progesterone may be stress responsive.

The Cortisol Awakening Response (CAR) is an increase in cortisol that occurs after awakening. An elevated CAR has been associated with depression.

This study investigates cortisol and progesterone responses to stress and the CAR as predictors of depression symptom development. This study also examines the role of rumination and life stress in the development of depression.

Hypotheses

1) Blunted cortisol and progesterone responses to stress will predict an increase in depressive symptoms.

2) An elevated CAR will predict an increase in depressive symptoms.

3) A ruminative response style and more stressful life events will predict an increase in depressive symptoms.

Participants

67 college students were recruited from introductory psychology classes and using posters around campus. Participants were prescreened for mid-range SDQ scores (14-26), and 7 were excluded for current or previous psychological disorder.

- 22 males (33%)
- 71% white
- Mean age of 19.04 (SD: 1.04)

Method

Baseline:

- Self-report questionnaires and psychosocial stressor
- Six saliva samples which were later assayed for cortisol and progesterone

Several days later:

- Five saliva samples over the half hour following awakening, for Cortisol Awakening Response (two days)
- Six months later:

Self-report measures:

- Depression symptoms: Beck Depression Inventory; measures severity of depression symptoms over the past 2 weeks
- Stressful events: Adolescent Life Events Questionnaire; measures number of stressful events experienced in last 5 weeks (out of 70)
- Response style: Response Styles Questionnaire Ruminative Subscale; measures ruminative responses to depressed mood

Psychosocial stressor: Trier Social Stress Test; participants give a short speech and do a mental math task before two unresponsive judges

Hormone assays: solid-phase 125 I radioimmunoassays

Results

Analyses: Multiple regression analysis with FIML estimation for missing data, run using the lavaan SEM package in R. All hormone analyses were run with area under the curve with respect to increase.

1) Cortisol and Progesterone stress responses were not significant predictors of depression symptoms at six months.

- Progesterone and cortisol responses to stress were positively correlated in this sample (r=0.3614, p<0.003).
- Progesterone was responsive to stress.

2) Elevated CAR was a significant predictor of more severe depression symptoms at six months (p<0.1).

3) Rumination and life events were not significant predictors of depression symptoms at six months.

Figure 1. Graph of area under the curve with respect to increase for Cortisol Awakening Response, averaged across subjects

Figure 2. Path diagram of multiple regression results. Standard errors are reported in parentheses.

Figure 3. Path diagram of final multiple regression results. Standard errors are reported in parentheses.

Discussion

- Elevated and blunted hormonal responses to stress may both indicate susceptibility to depression; such response patterns may have cancelled one another out in this sample.

- Elevated CAR might reflect negative cognitions upon awakening. Further research is needed to determine whether CAR confers susceptibility to depression or acts as an indicator of cognitive responses that confer vulnerability.

- ALEQ may not be an appropriate measure of stressful events experienced by college students, as our participants only reported a maximum of 7 stressful events out of 70.

- Other studies that have found ALEQ significant had greater reported ranges of ALEQ score and younger participant populations.

- Response style at baseline and 6 months were not correlated.

Cognitive vulnerability may change with age, and future research would be needed to better understand the role of response style in the development of depression.

References


All hormone analyses reported in parentheses.

Figure 2 and Figure 3 are reported in parentheses.

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