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Brain test predicts ability to achieve orgasm – but only in patients taking antidepressants

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Type of research: not peer-reviewed experimental study/people

Researchers have discovered that the ability to have an erection or to orgasm is related to the levels of serotonin in the brain, but this relation only applies to depressed patients taking SSRI antidepressants. At the moment, there is no test for who might experience sexual problems during treatment for depression, but this discovery may help depressed patients to choose antidepressants which allow them to maintain or regain an active sex life when treated with antidepressants.

.This work is presented at the ECNP conference in Amsterdam.

Sexual dysfunction is a common symptom of depression. SSRI antidepressants can help sexual dysfunction by improving mood, but at the same time SSRIs themselves are often associated with sexual side-effects. Unfortunately, there's no way of predicting these side effects in advance. Difficulty reaching orgasm is a common side effect, as are reduced desire and difficulty maintaining an erection. These side effects can affect up to 70% of patients taking SSRI medications, such as Prozac and escitalopram. These effects can be distressing, often leading to people stopping treatment.

The Copenhagen-based researchers studied 90 people who had been diagnosed with depression. They measured brain serotonin activity using a special EEG test called LDAEP (Loudness Dependence of Auditory Evoked Potentials), which is like a hearing test that reveals how your brain processes sound; perhaps surprisingly, this also tells us about serotonin levels in the brain - the lower the LDAEP, the higher the serotonin activity.

The patients then started an 8-week course of SSRI antidepressants, with the researchers carefully tracking any sexual side effects that developed. This allowed the researchers to see if they could predict who would have sexual problems based on their pretreatment LDAEP measurement.

Lead researcher Dr Kristian Jensen (from Copenhagen University Hospital) said:

"We discovered that people with higher serotonin activity before treatment started were much more likely to develop sexual side effects by the end of the 8-week antidepressant course, especially difficulty reaching orgasm. Using this non-invasive brain measure combined with information about sexual problems related to their depression, we could predict the ability to reach orgasm with 87% accuracy. We need a bigger study, with more men, to get an accurate figure for erectile dysfunction".

He continued:

“Currently, patients only discover sexual side effects after they've already started antidepressant medication. Measuring serotonin activity via the LDAEP test at the start of the course of antidepressants allows us to predict the likelihood of later sexual problems due to the SSRI. If confirmed, our findings could enable a more precise approach to depression treatment, helping doctors select medications to minimise sexual side effects in those patients most likely to develop SSRI-related problems. This could help treatment adherence and overall quality of life and generally give better treatment options for depression.

Our findings seem only to apply to medication-induced sexual problems, so it's not a general test for sexual difficulties. However, we are now looking to refine this, we have a 600-patient study underway which will look at how serotonin levels combined with sex hormones levels affect sexual function during depression and medication”.

Commenting, Professor Eric Ruhe, Professor in Difficult-to-Treat Depression at Radboudumc, Nijmegen, the Netherlands said:

“This is a very interesting study where the researchers innovatively use an easy-to-administer test to predict the chance of sexual dysfunction after the start of antidepressant. When replicated, this type of test might reliably help to know beforehand whether a patient will have sexual adverse effects or not. As many patients experience sexual dysfunction after the start of SSRI antidepressants (like escitalopram), the most important clinical application will be to predict that sexual dysfunction will not occur, especially in patients who worry about that adverse effect and are hesitant to initiate treatment.

I also encourage the researchers to expand their efforts towards developing a tool that can advise which drug to take instead, without just relying on current pharmacological considerations”.

Professor Ruhe was not involved in this work, this is an independent comment.

About the LDAEP test

Dr Kristian Jensen said *“The LDAEP itself is quite elegant: we play sounds at different volumes through headphones while measuring brain waves. It takes about 30 minutes and is non-invasive. It's not generally available at the moment, but that may change if this test lives up to expectations”.*

This work is currently under peer-review. The researchers note that the subjects in the study were comparatively young (average age 27) and mostly (73%) female, so they are now aiming to replicate the study in a much bigger group of 600 patients.

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Notes for Editors

This work is presented at the 38th ECNP Congress, taking place in Amsterdam and online 11-14th October 2025, see <https://www.ecnp.eu/congress2025/>. With more than 6,500 participants the ECNP Congress is Europe's leading platform for the science and treatment of brain disorders.

The work will be presented on Tuesday 14 October (note this is different to the embargo time)

Conference abstract

Serotonergic activity estimated by EEG loudness-dependent auditory evoked potentials as a predictor of SSRI-induced sexual dysfunction

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Background and aim: Sexual disturbance is a common symptom of major depressive disorder (MDD) affecting 40-60% of patients. While antidepressant treatment with selective serotonin reuptake inhibitors (SSRIs) is documented to improve mood and sexual functioning [1], SSRIs also frequently cause sexual side effects such as reduced sexual desire, reduced arousal and impaired orgasm, reported in 40-70% of patients [2]. SSRIs putatively increase central serotonin levels, which may lead to this sexual inhibition. Loudness Dependence of the Auditory Evoked Potential (LDAEP) is an EEG-based biomarker inversely linked to central serotonergic activity [3, 4]. Higher pretreatment LDAEP, indicating a lower serotonin tone, has been associated with better SSRI treatment response in previous studies [4]. LDAEP may also predict sexual side effects, in which baseline serotonergic tone may influence individual susceptibility to sexual dysfunction during treatment with SSRIs [5]. We therefore investigated whether pretreatment LDAEP is associated with SSRI-related sexual side effects and pretreatment sexual function in unmedicated patients with MDD.

Method: LDAEP was obtained from 90 unmedicated patients with MDD (aged 18-56, 73% female) before initiating treatment with escitalopram for eight weeks. Eight patients with <25% reduction in HAM-D6 (6-item subscale of the HAM-D17) at week four were switched to the serotonin-norepinephrine reuptake inhibitor (SNRI) duloxetine. Medication plasma levels assessed treatment adherence at week eight. Sexual function was measured before and after treatment, using the validated Danish version of the Changes in Sexual Functioning Questionnaire (CSFQ), and sexual SSRI side effects were assessed at week eight using the UKU standardised clinician-rated evaluation of SSRI side effects. We investigated the relation between pretreatment LDAEP and pretreatment sexual function (CSFQ), and the relation between pretreatment LDAEP and levels of UKU clinician-rated SSRI-induced side effects at week eight, using linear regression models adjusted for age and sex. To identify patients at risk for distressing sexual side effects (i.e. either UKU clinician-rated decreased libido or orgasmic dysfunction ≥ 2), we used logistic regression models with pretreatment LDAEP and depressive sexual disturbances (i.e. item 14 of HAM-D17), age and sex.

Results: LDAEP was negatively associated with the degree of SSRI-related orgasmic dysfunction at week eight ($\beta = -0.27$, 95% CI -0.53; -0.01, $p = 0.039$) and predicted orgasmic dysfunction with 87% accuracy (AUC = 0.85, 95% CI 0.74; 0.97, $p = 0.017$). LDAEP was also marginally negatively associated with the degree of SSRI-related decreased libido ($\beta = -0.23$, 95% CI -0.45; 0.00, $p = 0.050$), but did not significantly predict reduced libido (AUC = 0.83, 95% CI 0.68; 0.98, $p = 0.086$). LDAEP was not associated with pretreatment sexual function ($\beta = -3.02$ -6.72; 0.68, $p = 0.11$).

Conclusion: Low pretreatment LDAEP, indicating high central serotonergic activity, was associated with

increased SSRI-related sexual side effects, predominantly difficulty reaching orgasm or ejaculation. With further validation, LDAEP could be a useful biomarker to guide antidepressant treatment to minimise sexual side effects.

No conflict of interest



Photo of researcher Kristian Jensen wearing the high-density headset for LDAEP. The headset comprises 256 electrodes, plus earphones; these can give sound tones ranging from around 60dB (which is as loud as a conversation) to 100dB (as loud as a loud hairdryer).

Photo credit: Signe Ghodt