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ABCB1 Genetic testing to optimise selection of antidepressants in the treatment of depression



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Depression is a common and serious illness that can lead to disability or even suicide. According to WHO, it affects 300 million people worldwide, and about 2.5 million individuals in France each year. **There are currently one million cases of suicide each year around the world.**

Antidepressant treatment today

The first-line treatment of moderate to severe depression is antidepressants, which work by targeting different brain mechanisms. The choice of treatment and the dosage are generally probabilistic, and do not take into account variability between individuals that can modify the response to a treatment. Furthermore, even for responders, **the risk of relapse remains high; clinical treatment is effective if it leads to complete** remission rather than a short-term response.

It has been found that in 15% to 30% of cases of major depression, the patients had a resistant depression, characterised by the persistence of symptoms despite taking different treatments.



The ABCB1 gene: its role in the blood-brain barrier

Brain tissue is protected from potentially harmful substances circulating in the blood by the blood-brain barrier. The **permeability of the blood-brain barrier has a major influence on the effectiveness of antidepressants.** A central role is played by the P-glycoprotein (P-gp), a gatekeeper protein encoded by the ABCB1 gene, located in the blood-brain barrier that recognises almost 70% of prescribed antidepressants. **It has been shown that variants of the ABCB1 gene influence the function of P-gp and consequently, determine the therapeutic effect of antidepressants** (Uhr. 2008).

The variants of the ABCB1 gene

Patients who carry variant 1, have a P-gp that is known as "facilitative", because it facilitates the passage of antidepressants that it recognises, optimises their effectiveness and therefore the response to treatment. Patients who carry variant 2, have a P-gp that is known as "limiting", because it limits the passage of antidepressants that it recognises and therefore prevents an effective response by the patient to treatment.⁽¹⁾

Schematic representation of the mode of operation of P-gp according to the type of antidepressant



Genotyping to optimise the treatment of depression

Once the profile of the patient's P-gp has been identified, 3 therapeutic strategies can be considered:



The advantages of ABCB1 genotyping

Various studies have among other things shown that the rate of remission of patients with depression was higher for patients who took the ABCB1 test (^{2,3}).

Since 2016, ABCB1 genotyping has been recommended by the Swiss Society of Anxiety Disorders and Depression (SGAD/SSAD). It is recommended to perform the ABCB1 test before starting treatment or at the latest 3-4 weeks after the start of antidepressant treatment.



Remission rate greater than 22% in patients who took the ABCB1 test⁽²⁾

(1) Holsboer F. Clinical Impact of Pharmacogenetic Testing on Antidepressant Therapy. Austin Publishing Group 2018 September.

(2) Barbara Breitenstein, Sandra Scheuer, Hildegard Pfister, Manfred Uhr, Susanne Lucae, Florian Holsboer, Marcus Ising and Tanja M. Brückl. The clinical application of ABCB1 genotyping in antidepressant treatment: a pilot study. CNS Spectrums / FirstView Article /February 2014, 2014- 11

(3) A Ray, L Tennakoon, J Keller, JE Sarginson, HS Ryan, GM Murphy, LC Lazzeroni, MH Trivedi, JH Kocsis, C DeBattista and AF Schatzberg. ABCB1 (MDR1) predicts remission on P-gp substrates in chronic depression. The Pharmacogenomics Journal (2015) 15, 332 -339

Treatments with P-gp substrates**



**Non-exhaustive list

Benefits of Eurofins Biomnis ABCB1 genotyping

- Personalised treatment: **Prescribe the right substance in the right dose**
- An alternative approach for patients not responding to treatment
- Optimising treatment with antidepressants
- Higher remission rate
- Fewer side effects
- The ABCB1 analysis is only required once in the patient's lifetime
- Quick and simple genetic test
- Scientific advice from our experts: interpretation and report of the test results to guide the clinician in deciding treatment.





- Pre-analysis: 3ml of EDTA whole blood
- Technique: genotyping
- Storage: Room temperature
- Turnaround time: 2 weeks

Test instructions

- Clinician-patient consultation with explanation of ABCB1 test, prescription of test and completion of order forms and confirmation/consent forms (B36-INTGB)
- 2. Appointment at a medical laboratory: collection of blood sample
- 3. Forwarding of sample to Eurofins Biomnis by our authorised carrier
- 4. Performance of the test
- **5. Results are analysed** and returned to the attending physician within 2 weeks.
- 6. Therapeutic antidepressant dosage of antidepressants according to the patient's clinical indications. (Can be performed by Eurofins Biomnis)



Dedicated point of contact

From conducting the test to interpreting the results

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