Name:
Patient ID:
Age:
Sex: Male

Case ID:
Report ID:
Analysis Date: 21.10.2024
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EEG & ECG Biomarkers Report

- This report is intended to be used only by qualified medical practitioners.
- This report is intended to be used to improve decision-making within the scope of possible treatments already indicated for a patient.

- This report is not intended to be used to determine whether a patient should undergo treatment. It is also not intended to be used to determine if a treatment is indicated or contraindicated for a patient.
- This report is not intended for use in cases of neurological pathologies, scalp abnormalities, head injuries (in the EEG), or cardiac pathologies (in the ECG).
- This report is not intended to drive diagnosis, to be used as a vital signs monitor, or to be used in any situation where measured parameters could result in immediate danger to the patient.

Biomarker Correlations Summary

Condition	Treatment	Correlation
MDD	SSRI	Lower response rates than SNRI Heart Rate Regulation (BPM Slope), Vigilance Regulation
	SNRI	Higher response rates than SSRI Heart Rate Regulation (BPM Slope), Vigilance Regulation
	rTMS	10Hz left DLPFC has higher Response Rate than 1Hz right DLPFC Alpha Peak Frequency
	Ketamine (oral/i.v.)	Lower response rates for Ketamine Heart Rate (BPM), Vigilance Regulation A1 Stages
	ECT	Standard response rates Alpha Peak Frequency
Generalized Anxiety Disorder	Fluoxetine	Higher response rate for Fluoxetine LFnu
OCD	Combined SSRI and CBT	Higher response rates for combined SSRI and CBT treatment Vigilance Regulation 0 Stages

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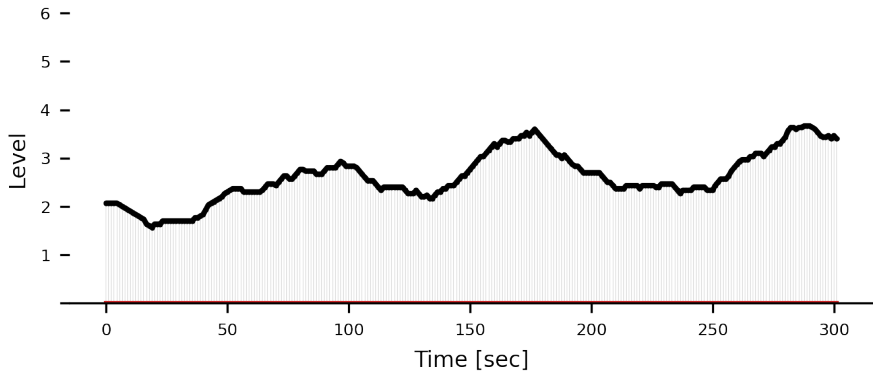
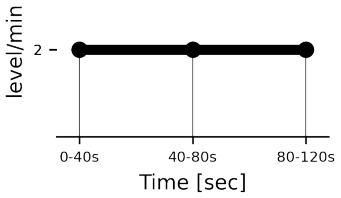
Vigilance

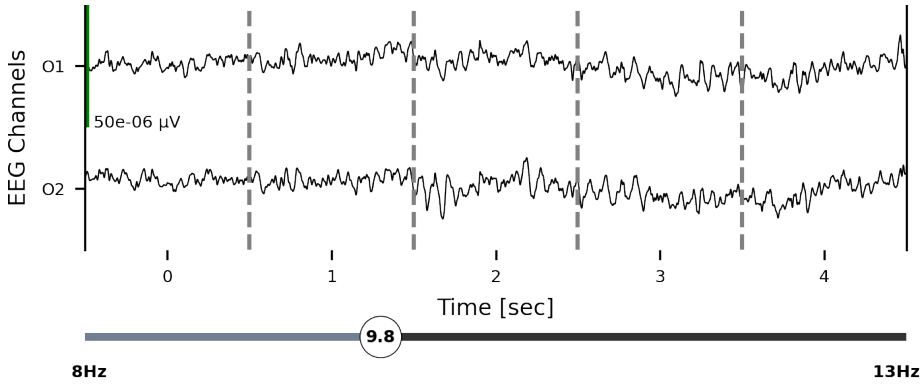


Vigilance Slope

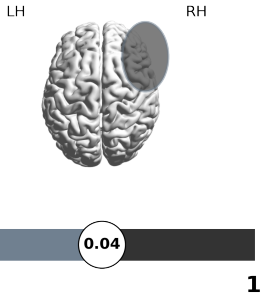
0.00 slope 2min



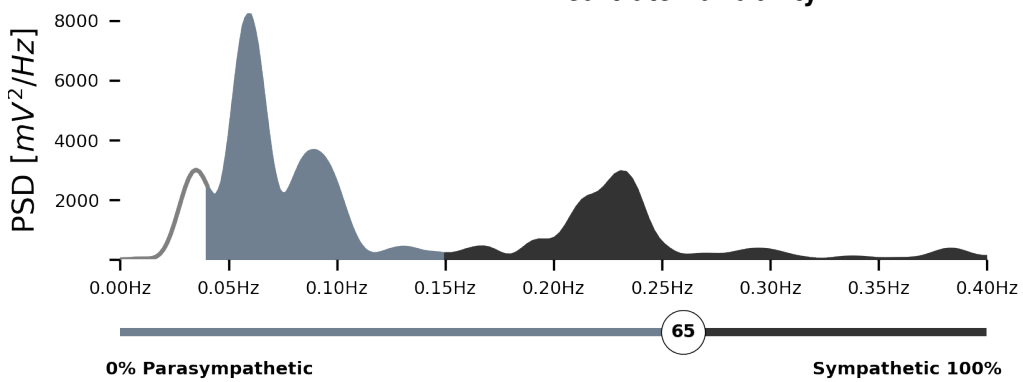
Alpha Peak Frequency

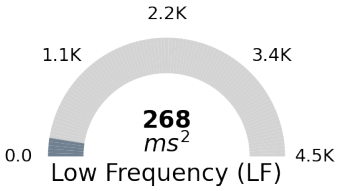


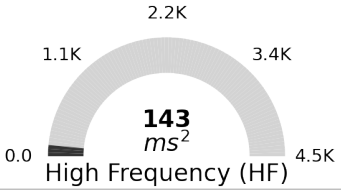
Frontal Alpha Asymmetry



Heartrate Variability

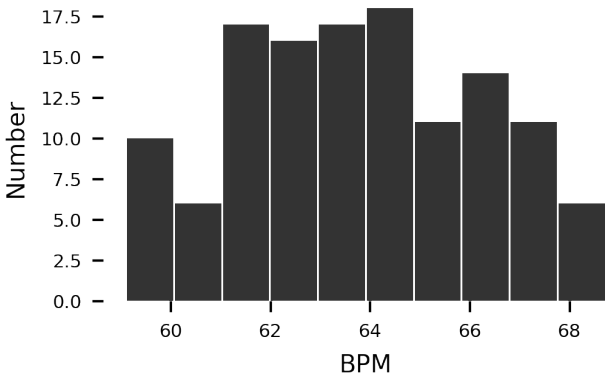






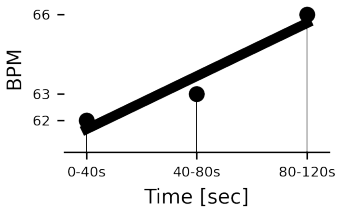
Heart Rate

64 bpm



Heart Rate Slope

2.25 bpm slope 2min



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Biomarker Values

	Value (first 2min)	Normal Interval (2 SD)
EEG:		
Alpha Peak Frequency (Hz)	9.8	(8.0 – 11.7)
Frontal Alpha Asymmetry (FAA)	0.0353	(-0.3 – 0.3)
qEEG Alpha (μV^2)	7.27	(0.0 – 144.0)
qEEG Beta (μV^2)	3.5	(0.0 – 16.0)
qEEG Delta (μV^2)	**16.66***	(0.0 – 16.0)
qEEG Gamma1 (μV^2)	1.67	(0.0 – 2.0)
qEEG Gamma2 (μV^2)	**0.64***	(0.0 – 0.2)
qEEG Theta (μV^2)	8.93	(0.0 – 32.0)
Slow Basic Rhtyhm	Yes	–
Vigilance Regulation 0 Stages (%)	0.3	(0.0 – 75.0)
Vigilance Regulation A1 Stages (%)	1.7	–
Vigilance Level ($Level$)	**2.0***	(2.2 – 6.0)
Vigilance Mean ($Level$)	2.6	(2.24 – 6.0)
Vigilance Regulation ($Level/min$)	-0.0	(-0.5 – 0.4)
Vigilance Regulation 5.0min ($Level/min$)	0.4	–
ECG:		
Heart Rate (BPM) ($beats/min$)	64.0	(53.0 – 76.0)
Heart Rate Regulation (BPM Slope) ($beats/min^2$)	2.25	(-2.91 – 2.73)
Total HRV Power (ms^2)	411.1	(0.0 – 8011.0)
Parasympathetic Activity (HF) (ms^2)	142.99	(0.0 – 4320.0)
Sympathetic Activity (LF) (ms^2)	268.13	(0.0 – 4242.0)
LFnu (%)	65.2	(7.0 – 96.0)

Analysis Characteristics

- EEG analysis completed successfully. ECG analysis completed successfully.
- All biomarkers were computed successfully.

Recording Date:	19.06.2024		
Sampling Frequency:	1000 Hz		
Total Recording Duration:	1288s (21.5m)	Analysis Interval:	285s – 586s (5.0m)
Number of Channels:	23	Channel Types:	EEG(21) EOG(1) ECG(1)
Bad Channels Interpolated:	C3, Fp2, P4	EOG Channel:	EOG (POL PG1 – POL PG2)
Number of Epochs:	295	Epochs with Artefacts:	6 (2.0%)
ECG Peaks:	127	Peaks Corrected:	None

Interpretations

EEG

- **Alpha Peak Frequency (APF) [2, 3, 5, 19, 26]** In this EEG medium Alpha Peak Frequency. In this case, for depression, 10Hz TMS protocols over the left DLPFC may be more effective than 1Hz protocols over the right DLPFC. (Evidence Level 2)
- **Basic Rhythm Slow [1]** In this EEG pathologically low Basic Rhythm Peak Frequency. Like in this case, a very slow basic rhythm is a sign of pathological activity with an organic cause, related to e.g. dementia or delirium. A slow basic rhythm <8Hz like here also has been associated with better response to Sertralin in comparison to Escitalopram and Venlafaxin in depressed patients. (Evidence Level 2)
- **Percentage of vigilance stage 0 [6]** In this EEG low amount of vigilance stage 0 . In this case correlation with a more likely response to combined SSRI + Cognitive Behavioral Therapy in Obsessive Compulsive Disorder in comparison to SSRI or CBT alone. (Evidence Level 2)
- **Percentage of vigilance stage A1 [11]** In this EEG low amount of vigilance stage A1. In this case, low percentages of EEG-vigilance stage A1 are associated with a lower probability to respond to i.v. ketamine and oral ketamine. (Evidence Level 2)
- **Vigilance Level [23]** In this EEG low vigilance level. Like in this case, low vigilance levels can be associated with higher probabiliuty for remission of depression for SSRI treatment. (Evidence Level 2)
- **Vigilance Regulation 2min [12, 18, 20]** In this EEG increase or no initial decrease of vigilance during the first 2 minutes. For this case, literature shows lower response rates in depression to SSRIs and SNRIs can be more effective. (Evidence Level 2)
- **Vigilance Regulation [8, 9, 10, 12, 16, 17, 22, 23]** In this EEG no decrease of vigilance in the analysis interval of (5.0min). This is commonly observed in patients diagnosed with depression or OCD. In this case less likely remission opf depression fopr SSRI treatment. (Evidence Level 2)

ECG

- **Heart Rate (BPM) [14]** In this ECG low heart rate. In this case correlation with less likely response to ketamine (i.v.) in depression. (Evidence Level 2)
- **Heart Rate Regulation (BPM Slope) [18]** In this ECG substantial rising of BPM. In this case in depression, correlation with higher response rates for venlafaxine (SNRI), less likely response to SSRIs (Evidence Level 2)
- **Sum of Parasympathetic and Sympathetic Activity [14]** In this ECG low general activity of the autonomic nervous system. In this case correlation with increased response probability to ketamine (i.v.) in depression. (Evidence Level 2)
- **Absolute parasympathetic Activation [15]** In this ECG low absolute parasympathetic activation. In this case correlation with an higher likely response to SSRI, CBT or combination in obsessive compulsive disorder. (Evidence Level 2)
- **Absolute Sympathetic Activation [21]** In this ECG normal absolute sympathetic activation. In this case compared to the average population, total sympathetic activity is normal.
- **Relative Sympathetic/Parasymathetic Activation [7]** In this ECG shift toward Sympatheticus. In this case correlation with a good response to Fluoxetine in generalized anxiety disorder. (Evidence Level 2)

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