CLAIMS

1. A device adapted detecting lateral brainstem response states of a subject over a period of time as a function of a population of neurons' response patterns to sound stimuli, comprising:

a sound stimuli generating unit operative to repeatedly send, over said period of time, an identical sound stimulus (10) to said subject to evoke said neurons response patterns, wherein said sound stimulus (10) comprises a first train of unmodified sound pulses (11) and at least one second consecutive train of modified sound pulses (12);

a detection unit operative to detect a brainstem response signal related to said neurons' response patterns, wherein a first brainstem response signal (90) is caused by said first train of sound pulses (11) and at least one second brainstem response signal (91) is caused by said second consecutive train of modified sound pulses (12);

a storage unit operative to store information based on said brainstem response signals;

and a control unit operative to repeatedly, over said period of time, determine said lateral brainstem response states(14) for each of said sound stimulus (10), said lateral brainstem response states (14) are relative values obtained by a comparisons (13) of said first brainstem response signal (90) and said at least one second brainstem response signal (91) of said sound stimulus (10).

2. The device according to claim 1, wherein said generated first train of sound pulses is a train of predetermined and fixed sound pulses comprising at least one sound pulse that is configured to evoke at least one of said neurons in the brainstem and upon repetition, and wherein said sound pulses evoke an activity of said population of said subject's brainstem neurons; and/or wherein the generated second train of sound pulses comprises at least one modified sound pulse of said first train of sound pulses, and wherein the modification of the sound pulses, forming the second train of sound pulses, comprising adding noise either before, after or on top of each sound pulse of said train of sound pulses; and/or by an increased and/or lowered frequency and/or amplitude of said second train of sound pulses in comparison to said first train of sound pulses; and/or wherein said first brainstem response signal (90) corresponds to said first train of sound pulses (11) and provides a reference state signal within said sound stimulus (10) for said subject's lateral brainstem response state.

3. The device according to any of claim 1 or 2, wherein said control unit is adapted to detect a development of said lateral brainstem response states over said period of time; and/or wherein said control unit is operative to determine an average first brainstem response signal and at least one average second brainstem response signal from said first and said at least second train of sound stimuli when comprising of a plurality of sound pulses; and/or wherein said control unit is operative to monitor different neurons responses to different sound stimuli simultaneously.

4. The device according to any of claims 1 to -3, wherein said detected lateral brainstem response state of a subject is a pattern profile of a lateral brainstem response state of said subject.

5. The device according to claim -4, wherein said control unit is adapted to compare said pattern profile to a known profile from a database comprising a population of known profiles, and to determine if said subject is under influence of a psychotropic compound or substance or food.

6. The device according to claim 5, wherein said control unit is adapted to determine said psychotropic compound or substance or food qualitatively and/or quantitatively.

7 The device according to claim 4, wherein said control unit is adapted to compare said pattern profile to a known profile from a database comprising a population of known profiles, and to determine an effective therapy and/or treatment for said subject.

8 A system for detecting a lateral brainstem response state development of a subject comprising a device according to any of claims 1 to 4;

said system is adapted to repeatedly generate and send, over a period of time being a first period of time, a sound stimulus comprising a first train of sound pulses and at least a second consecutive trains of modified sound pulses to said subject ; and

said system being operative to establish a lateral brainstem response state baseline of said subject based on comparisons of said first brainstem response signal (90) and said at least one second brainstem response signal (91) of said sound stimulus repeated over said first period of time.

9. The system according to claim 8, wherein said system is adapted to repeatedly generate and send said sound stimuli over at least said period of time being a second period of time to said subject after administration of a psychotropic compound or substance or food or a placebo or therapy;

wherein a subject's brainstem response state development is monitored and determined by said system, such as in real-time, during a measurement session lasting said second period of time and wherein the determination of said subject's brainstem response state development is a comparison of a current lateral brainstem response state to said baseline of said subject.

10 The system according to claim 9, wherein said system is adapted to determine a short time effect or influence of a psychotropic compound or substance or food or a placebo or therapy on said subject's brainstem response state.

11 The system according to any of claim 9, wherein said system is adapted to repeatedly generate and send said sound stimuli to said subject at least at a second measurement session subsequently conducted at a later occasion after a first session, and wherein said control unit is operative to determine said subject's brainstem response state development as a comparison of said current lateral brainstem response state to said baseline of said subject, wherein said baseline is established at said first measuring session.

12. The system according to any of claim 11 wherein said system is adapted to determine a long term treatment effect or influence of a psychotropic compound or substance or food or a placebo on said subject's brainstem response state.

13 A method for controlling a device, by a controller of a device, to detect lateral brainstem response states of a subject over a period of time as a function of a population of neurons evoked response patterns to sound stimuli, wherein said method comprising:

controlling the device to repeatedly presenting said subject with an identical sound stimulus, over said period of time, evoking said neurons response patterns wherein said sound stimulus comprising a first train of unmodified sound pulses and at least a second consecutive train of modified sounds pulses;

controlling the device to evoke a first brainstem response signal by said first train of unmodified sound pulses and evoking a second brainstem response signal by said second train of modified sound pulses;

controlling the device to detect said first and second response signals related to said neurons response patterns; and

controlling the device to determine said lateral brainstem response states as relative values repeatedly, over said period of time, based on a comparison between said first and second brainstem response signals of each of said sound stimulus, wherein said method comprises: controlling the device to generate said first train of sound pulses comprising a train of predetermined and fixed sound pulses and upon repetition of said sound stimulus always identical sound pulses, and wherein said sound pulses is used as for determining an activity of said subject's brainstem neurons activity, and/or controlling the device to generate said second train of sound pulses comprising at least one modified sound pulse of said first train of sound pulses.

14. The method according to claim 13, further comprising controlling the device to provide a reference state signal, within said sound stimuli, for said subject's lateral brainstem response states being said first brainstem response signal corresponding to said first train of sound pulses; and/or further comprising controlling the device to determine a development of said lateral brainstem response states over said period of time; and/or further comprising controlling the device determine an average first brainstem response signal and at least an average second brainstem response signal when said first and sat at least second train of sound stimuli comprises of a plurality of sound pulses.

15. The method according to any of claims 13 to 14, further comprising controlling the device to detect said lateral brainstem response state of a subject being a pattern profile of a lateral brainstem response state of said subject.

16. The method according to claim 15, further comprising controlling the device to compare said pattern profile to a known profile from a database comprising a population of known profiles, and determine if said subject being under influence of a psychotropic compound or substance or food.

17. The method according to claim 16, further comprising controlling the device to determine said psychotropic compound or substance or food quantitatively and/or qualitatively.

18. The method according to claim 15, further comprising controlling the device to compare said pattern profile to a known profile from a database comprising a population of known profiles, and to determine an effective therapy and/or treatment for said subject.

19. The method according to any of claims 13 to 15, further comprising:

controlling the device to establish a lateral brainstem response state baseline of said subject by repeatedly generating and sending, over a first period of time, said sound stimuli comprising said first train of sound pulses and at least said second consecutive trains of modified sound pulses to said subject, not under influence of a psychotropic compound or substance or food or therapy

20. The method according to claim 19, further comprising:

controlling the device to generate and sending, repeatedly, said sound stimuli, over at least a second period of time, to said subject after administration of a psychotropic compound or substance or food or a placebo or therapy; and

controlling the device to monitor and determining said subject's brainstem response state development in real-time, during a measurement session, lasting said second period of time, and wherein the determination of said subject's brainstem response state development being a comparison of a current lateral brainstem response state to said baseline of said subject.

21. The method according to claim 20, further comprising controlling the device to determine a short time effect or influence of a psychotropic compound or substance or food or a placebo or therapy on said subject's brainstem response state.

22. The method according to claim 20, further comprising controlling the device to conduct said repeatedly generating and sending of said sound stimuli to said subject at least at a second measurement session subsequently after a first session, at a later occasion; and

controlling the device to determine said subject's brainstem response state development by comparing said current lateral brainstem response state to said baseline of said subject, wherein said baseline is established at said first measuring session.

23. The method according to claim 22, further comprising controlling the device to determine a long term treatment effect or influence of a psychotropic compound or substance or food or a placebo on said subject's brainstem response state.

24. The method according to claim 20 or 22, comprising controlling the device tp establish said baseline, during said first period of time, when said subject is not under influence of a psychotropic compound or substance or food or therapy; conducting measurements during said second period of time after administration of a psychotropic compound or substance or food or a placebo or therapy to said subject.

25. An audiometry brainstem response system, comprising a detecting unit to detect an effect of a substance on the brain of a person based on differences in obtained brainstem responses states , wherein said substance is a psychoactive compound and said effect is caused by said psychoactive compound, or wherein said substance is food and said effect is caused by said food, or wherein said substance is a medical drug and said effect is caused by said medical drug, or wherein said substance is a chemical substance administered to said person and said effect is caused by said chemical substance, or wherein said substance is a herbal compound and said effect is caused by said herbal compound, or wherein said substance is a gas inhaled by said person and said effect is caused by said gas, or wherein said substance is a fragrance to which said person is subject to and said effect is caused by said fragrance; and the detecting unit including determining unit to determine when said person starts to perceive said effect, wherein said effect is determined before the subject is aware of the effect.

26. The device of any of claims 1 to 7 further adapted detecting an effect of substance on the brain of a person based on differences in obtained brainstem responses states, wherein said substance is a psychoactive compound and said effect is caused by said psychoactive compound, or wherein said substance is food and said effect is caused by said food, or wherein said substance is a medical drug and said effect is caused by said medical drug, or wherein said substance is a chemical substance administered to said person and said

effect is caused by said chemical substance, or wherein said substance is a herbal compound and said effect is caused by said herbal compound, or wherein said substance is a gas inhaled by said person and said effect is caused by said gas, or wherein said substance is a fragrance to which said person is subject to and said effect is caused by said fragrance; and the control unit adapted determining when said person starts to perceive said effect, wherein said effect is determined before the subject is aware of the effect.

27. An audiometry brainstem response system for detecting an effect of a substance on the brain of a person based on differences in obtained brainstem responses states, comprising the device of claim 26.

28. The method of any of claims 13 to 24, further comprising for controlling the device to detect an effect of a substance on the brain of a person based on differences in obtained brainstem responses states, wherein said substance is a psychoactive compound and said effect is caused by said psychoactive compound, or wherein said substance is food and said effect is caused by said food, or wherein said substance is a medical drug and said effect is caused by said medical drug, or wherein said substance is a chemical substance administered to said person and said effect is caused by said chemical substance, or wherein said substance is a herbal compound and said effect is caused by said herbal compound, or wherein said substance is a gas inhaled by said person and said effect is caused by said gas, or wherein said substance is a fragrance to which said person is subject to and said effect is caused by said fragrance; and the controlling including controlling the device to determine when said person starts to perceive said effect, wherein said effect is determined before the subject is aware of the effect.

29. An audiometry brainstem response system adapted detecting lateral brainstem response states of a subject for blind identification of a substance through brain pattern analysis; and/or monitoring neurophysiological effects of psychotropic compounds or substance or food or therapy in real-time, comprising a detecting unit detecting when a medication has an effect on a person, such as an ADHD medication and said detecting unit detects said effect by detecting a lowered average activity of the lateral brainstem response state for specific neurons thereof.

30. The device of any claims 1 to 7 adapted detecting lateral brainstem response states of a subject for blind identification of a substance through brain pattern analysis; and/or monitoring neurophysiological effects of psychotropic compounds or substance or food or therapy in real-time, comprising an effect detecting unit for detecting when a medication has an effect on a person, such as an ADHD medication and the effect detecting unit detect the effect by detecting a lowered average activity of the lateral brainstem response state for specific neurons thereof.

31. An audiometry brainstem response system adapted detecting lateral brainstem response states of a subject for blind identification of a substance through brain pattern analysis; and/or monitoring neurophysiological effects of psychotropic compounds or substance or food or therapy in real-time, comprising the device of claim 30.

32. The method of any of claims 13 to 24, further comprising detecting when a medication has an effect on a person an ADHD medication for detecting lateral brainstem response states of a subject for blind identification of a substance through brain pattern analysis; and/or monitoring neurophysiological effects of psychotropic compounds or substance or food or therapy in real-time, said effect is detected by detecting a lowered average activity of the lateral brainstem response state for specific neurons thereof.

33. A program for causing a processer to execute the method recited in any one of claims 13 to 24.