

(Time 90 min)

All 10 questions are equally weighted, i.e. 6 points per question.

Answers may be given in English or German.

You must put your name on EVERY SHEET!

S2 S5

1. Multiple Sclerosis (only 1 answer is correct): (6 points)

Which answer is best (2 points):

The etiology of Multiple Sclerosis is most probably due to

- ☒ a) multiple factors
- b) an autosomal recessive defect
- c) due to a virus infection
- d) due to toxins in the environment
- e) nutritional reasons

✓

Which answer is best concerning the efficacy of current disease-modifying therapies against Multiple Sclerosis (MS) (2 points):

- a) They are of too low efficacy to justify their usage in young adults.
- b) Regularly, they completely stop disease activity.
- c) They cure Multiple Sclerosis.
- ☒ d) They are more effective against relapsing-remitting MS than against secondary progressive MS.

✓

Which answer is best:

A 30 year-old man with known relapsing-remitting Multiple Sclerosis presents with right hemiparesis and bladder dysfunction as symptoms of an acute relapse. How will he probably be treated in the very acute phase? (2 points)

- ☒ a) No specific therapy, but physiotherapy and psychotherapeutic support.
- b) With steroids.
- c) With natalizumab.
- d) With interferons.
- e) With glatirameracetate.

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2. Neuromuscular Disorders (only 1 answer is correct): (6 points)

1. Neuromuscular Disorder include all but one: (1 point)

- a) Motoneuron diseases
- b) Poly-neuropathy
- ☒ c) Encephalomyelitis disseminata
- d) Neuromuscular transmission disorders
- e) Myopathy

2. Which statement about myotonic dystrophy (DM1) is correct: (2 points)

- ☒ a) DM1 is the most common type of muscle dystrophy in children and adults
- ☐ b) DM1 may be associated with a cardiomyopathy and diabetes
- ☐ c) DM1 may be associated with a retinitis pigmentosa and cataracts
- ☐ d) Diagnosis of DM1 requires a muscle biopsy
- e) all of the above answers

3. Which statement about Pompe's disease (Acid maltase deficiency [acid α -1,4-glucosidase]) is correct: (1 point)

- a) Disease onset is below 18 years
- b) The clinical picture includes a myopathic face
- ☒ c) The painless weakness is distally pronounced
- ☒ d) Diagnosis of Pompe's disease may be made by enzymatic assays and molecular genetic analysis
- e) Muscle biopsy demonstrates lack of glycogen

4. Autoimmune inflammatory polyneuropathies: (2 points)

- a) Acute Guillain-Barré syndrome (GBS) affects more men than women and can be treated with intravenous immunoglobulins or plasmapheresis
- ☒ b) Chronic inflammatory demyelinating polyneuropathy (CIDP) may have a chronic progressive or a relapsing remitting course
- c) In contrast to GBS, CIDP may be treated with corticosteroids.
- d) The presence of multifocal motor neuropathy (MMN) has to be evaluated in the work-up of patients with amyotrophic lateral sclerosis (ALS) with electroneurography and determination of anti-GM1-antibodies
- ☒ e) all of the above answers

0,5

1,5

3. Dementia (only 1 answer is correct): (6 points)

1. Alzheimer's dementia is characterized: (2 point)

- a) by behavioural problems occurring early in the disease
- b) by the presence of neurofibrillary tangles in the absence of cerebral amyloid-deposition
- c) by a biomarker profile of low CSF A β 42 and mediotemporal atrophy on MRI ✓
- d) by mild cognitive impairment

2. Which statement is **NOT** true for dementia with lewy bodies (DLB) (2 points)

- a) Lewy bodies consist of α -synuclein deposits ✓
- b) cerebral amyloid deposition is seen in more than half of the cases with a clinical diagnosis of DLB
- c) Visual hallucinations in DLB are usual treated with typical neuroleptics that prevent hallucinations by blocking dopamine receptors.
- d) Symptoms of parkinson's disease which is also an α -synucleinopathy can be observed in DLB ✓
- e) REM sleep behavioural disorder can be seen in DLB ✓

3. Which statement is **NOT** true for frontotemporal lobar degeneration (2 point)

- a) an imaging finding is atrophy in the anterior temporal lobe ✓
- b) an imaging finding is reduced cerebral glucose metabolism in the anterior temporal lobe ✓
- c) the underlying pathology can be correctly predicted by clinical assessment in over 80% of the cases
- d) loss of empathy and sympathy occur early in the context of the behavioural variant ✓
- e) altered eating habits are a feature of the behavioural variant

4. Amyotrophic lateral sclerosis (ALS) and Frontotemporal lobar degeneration (FTLD)
(only 1 answer is correct): (6 points)

1. Amyotrophic lateral sclerosis (ALS) and Frontotemporal lobar degeneration (FTLD) are (1 point):

- ☒ a) Two different neurodegenerative diseases that overlap clinically, pathologically and genetically
- ☐ b) Two different names for the same disease
- ☐ c) Both neurodegenerative diseases that affect motor neurons
- ☐ d) Both neurodegenerative diseases that affect the frontal cortex
- ☐ e) Always occurring in the same patients

2. The major protein component of the ubiquitinated inclusions found in motor neurons of sporadic ALS patients is (1 point):

- ☐ a) SOD1
- ☐ b) C9ORF72
- ☐ c) FUS
- ☒ d) TDP-43
- ☐ e) Ataxin 2

3. The most common genetic cause of ALS and FTLD is mutation in (1 point):

- ☐ a) SOD1
- ☒ b) C9ORF72
- ☐ c) FUS
- ☐ d) TDP-43
- ☐ e) Ataxin 2

4. The neurotoxicity of TDP-43 and FUS is due to the following mechanism (2 points):

- ☐ a) Loss of their normal function due to the loss of TDP-43 (or FUS) from the nucleus
- ☐ b) Gain of toxicity from abnormal TDP-43 (or FUS) cytoplasmic aggregates
- ☒ c) Both a and b are likely contributing to disease
- ☐ d) TDP-43 (or FUS) RNA becomes toxic for neurons
- ☐ e) TDP-43 and FUS are not important for ALS pathogenesis

5. In addition to weakness and muscle wasting, symptoms of ALS include (1 point):

- ☐ a) Cramps
- ☐ b) Fasciculations (muscle twitches)
- ☐ c) Weight loss
- ☐ d) Hypersalivation
- ☒ e) All of the above

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5. Parkinson's Disease (only 1 answer is correct): (6 points)

1) The following protein pathologically accumulates in the brain of Parkinson patients (1 point):

- a) TDP-43
- b) Amyloid
- c) Alpha-Synuclein ✓
- d) Tau
- e) Ubiquitin

2) The following symptoms belong to the cardinal symptoms of Parkinson's disease except for (1 point):

- a) Akinesia
- b) Rigidity
- c) Dystonia ✓
- d) Tremor
- e) Postural instability

3) Which of the following non-motor symptoms can be caused by dopaminergic treatment? (1 point):

- a) Impulse control disorders ✓
- b) Constipation ✓
- c) Urinary incontinence ✓
- d) Dementia
- e) Anxiety ✓

4) Deep brain stimulation in Parkinson's disease...(1 point)

- a) ...is the most promising tool to decelerate underlying neuropathological processes.
- b) ...acts via direct stimulation of corticospinal pathways.
- c) ...improves most but not all of the motor symptoms of Parkinson's disease. ✓
- d) ...causes irreversible effects.
- e) ...improves most but not all of the non-motor symptoms of Parkinson's disease.

5) The following examination is the most important step in the diagnosis of Parkinson's disease: (1 point)

- a) Clinical examination ✓
- b) Cerebral MRI
- c) Transcranial ultrasound
- d) Functional imaging (PET, SPECT)
- e) Cerebrospinal fluid analyses

6) All of the statements below are true except for the following one: (1 point)

- a) Parkinson's disease is caused by accumulation of alpha-synuclein-positive Lewy bodies in the brain. ✓
- b) Many patients with Parkinson's disease suffer from non-motor symptoms such as depression, dementia or autonomous symptoms. ✓
- c) The cardinal symptoms of Parkinson's disease consist of akinesia, rigidity, tremor, and postural instability. ✓
- d) The primary goal of the treatment of Parkinson's disease is to decelerate the underlying neuropathological process. ✓
- e) Deep brain stimulation is an effective treatment for some motor symptoms of Parkinson's disease. ✓

6. Brain Tumour: (one or several answers may be correct, it is prohibited to cross all the answers): (6 points)

1. Therapy of glioblastoma involves (1 point):

- a) Surgery
- b) Radiotherapy
- ☒ c) Chemotherapy
- ☒ d) All of the above

0,33

2. Which of the following is true (more than one answer can be correct) (2 points):

- ☒ a) Standard therapy of glioblastoma consists of combined radiochemotherapy with temozolomide followed by temozolomide alone
- ☒ b) MGMT is a predictive marker for response to temozolomide ✓
- c) All patients must be treated in the context of a clinical study
- d) All of the above is true

3. Which of the following is **NOT** true: high grade gliomas are characterized by (1 point)

- a) Mitoses ✓
- b) Vascular proliferation ✓
- ☒ c) Pseudopalisading necrosis
- d) Circumscribed growth pattern

4. Intraoperative imaging techniques comprise (more than one answer can be correct) (1 point):

- ☒ a) Intraoperative ultrasound
- ☒ b) Intraoperative MRI
- c) Intraoperative PET
- ☒ d) Intraoperative use of 5-aminolevulinic acid fluorescence

0,66

5. A patient presents with headache, nausea and morning vomiting for the past days. Which diagnostic measure should be performed first (1 point):

- a) MRI ✗
- b) EEG ✓
- c) Lumbar puncture
- ☒ d) Clinical examination
- ☒ e) PET Scan

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7. Neuropsychology: (one or several answers may be correct, it is prohibited to cross all the answers): (6 points)

1.) What is **NOT** true about aphasia? (1point)

- a) Sensory aphasia is not the primary cause of apraxia
- b) Recovery from aphasia is independent of handedness ✓
- c) One feature of Wernicke aphasia is anosognosia ✓
- Ⓐ d) Writing spared, reading can be severely impaired
- e) Amnesic aphasia is a relatively mild form of aphasia ✓

2.) Which language aspect is typically affected by a lesion between Broca's and Wernicke's area? (1point)

- Ⓐ a) Spontaneous speech
- b) Intonation
- c) Reading, but not writing ✗
- d) Repetition of heard words and sentences ✗
- e) Naming ✗

3.) Which two statements are correct? (more than one answer can be correct) (2 points)

- Ⓐ a) Apraxia is a disconnection syndrome *Cerebral Callosum*
- b) Selective apraxia for the left hand does not exist
- c) Apraxia without aphasia does not exist
- d) Apraxia and neglect are mutually exclusive
- Ⓐ e) Apraxia is commonly accompanied by aphasic symptoms ✓

4.) What is true about neglect? (1 point)

- a) Neglect is typically produced by a brain tumor ✗
- Ⓐ b) Neglect implies blindness in one visual field ("hemianopia")
- c) Neglect is a retinotopic disorder
- d) Neglect is a paradigm disorder to study reference frames in central processing
- e) Neglect has a strong genetic component

5.) What is **NOT** true about pseudoneglect? (1point)

- a) Pseudoneglect is synonymous to "right-sided spatial inattention"
- b) Pseudoneglect is observed in healthy individuals
- c) Pseudoneglect is amplified by a right parietal lesion
- d) Pseudoneglect can affect number space
- Ⓐ e) Pseudoneglect is pronounced in psychotic individuals

8. ADHS: (only 1 answer is correct) (6 points)

Which of the following statements is **NOT** correct? (6 points)

- ☒ a) Approximately 65-80% of the affected children with an ADHD diagnosis have at least an additional comorbidity. It concerns often oppositional disturbances. ✓
- b) The taking of stimulants by children and adolescents with a diagnosis of ADHD creates in many cases the prerequisite e.g. concentration, so that certain tasks can be done in a more effective way. ✓
- c) Shaw et al. (2007) could show in his study that children with ADHD have a delayed development of the cortical thickness, compared to healthy Children. ✓
- d) One of the most common side-effects of the stimulants is the physical and psychological dependence.
- ☒ e) Different brain structures and functional networks take part in an ADHD, which also reflects the variety of symptoms shown by ADHD concerned people. ✓

9. Schizophrenia: (only 1 answer is correct) (6 points)

1. The lifetime prevalence of Schizophrenia in the total population is: (1 point)

- a) 5-6% ✓
- b) 2-3% ✗
- c) 0,5-1,6%
- (d) 0,1-0,6%
- e) 0,01-0,06%

2. Which statement is **wrong**? (2 points)

The following diagnostic analysis should be performed obligatory or optional in case of suspect of schizophrenia:

- a) Genotyping at the time of the disease manifestation
- (b) cerebral imaging techniques (CCT, MRI)
- c) an internistic/neurological examination
- d) labor analysis of thyroid parameters

3. All listed symptoms are characteristic for schizophrenia beside: (2 points)

- a) hearing your own thoughts ✓
- b) thoughts withdrawal ✓
- c) Delusions of control ✓
- d) Thought broadcasting
- (e) increased excitability of the vegetative system

4. Currently it is assumed that following neurotransmitter circuits are involved in schizophrenia beside: (1 point)

- a) Dysfunction of the GABAergic System
- b) Dysfunction of the serotonergic System
- (c) Excessive dopamine activity in the mesolimbic System
- d) Excessive dopamine activity in the mesocortical System
- e) Hypo-function of the Glutamate System

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10. Neurorehabilitation: (one or several answers may be correct, it is prohibited to cross all the answers): (6 points)

1. Tetraplegia: (more than one answer can be correct) (1 point)

- a) leads to paralysis exclusively of the lower part of the body and the legs x
- ☒ b) is usually bilateral
- c) the full state of functional deficits is seen within minutes after the injury
- d) surgical stabilization of the spinal column leads to functional recovery
- e) motor and sensory functions are affected

0,5

2. Intense rehabilitative motor training after spinal cord injury or stroke can lead to: (more than one answer can be correct) (2 points)

- a) long distance nerve fiber regeneration
- b) enhanced compensatory sprouting of neurites
- c) stabilization of synaptic connections
- d) repair of damaged myelin
- ☒ e) all of the above

1

3. Constraint-induced movement therapy: (2 points)

- a) is motivating
- b) is available to all patients independent of the degree of impairment
- c) helps improve function and overcome learned non-use
- ☒ d) helps reduce motor impairment
- e) restrains the impaired limb

✓

4. Which of the following statements about robot-assisted rehabilitation is **INCORRECT**? (1 point)

- a) provides objective readouts about motor and sensory function/impairments
- b) is as efficient as dose-matched conventional therapy ✓
- ☒ c) results in much better recovery of functions that cannot be improved by conventional therapy
- d) allows to optimally engage the patient by adapting difficulty and assistance to his/her level of impairment ✓

✓

2,5