**July 2021 Copy**

**Memantine**

Day 1: A derivative of the anti-viral drug amantadine, [#memantine](https://twitter.com/search?q=%23memantine) was first synthesised in the 1960s. The anti-viral action (of both drugs) remains unclear & neither is recommended for use as an anti-viral agent. However, [#memantine](https://twitter.com/search?q=%23memantine) is known to be effective for Alzheimer’s disease (AD) & was licensed in Europe in 2013

Day 2: [#memantine](https://twitter.com/search?q=%23memantine) is used 2nd line for moderate-severe AD, usual maintenance 20mg/day; tablet or oral solution. Can be an alternative to acetylcholinesterase inhibitors (AChIs);[#memantine](https://twitter.com/search?q=%23memantine) can also be added to the AChI (combination may have additive effect but poor evidence)

Day 3: Kinetics; [#memantine](https://twitter.com/search?q=%23memantine) is 100% bioavailable post oral absorption! Minor metabolism possible via phase 2. 99% renal excretion therefore care in renal impairment (if severe halve the dose). Active tubular reabsorption occurs, which is enhanced by increased pH, so diet or antacids can affect clearance. T½ 2-4 days

Day 4: MOA: [#memantine](https://twitter.com/search?q=%23memantine) is a non-competitive NMDA antagonist, whereby it preferentially blocks overactive channels (this may be what leads to AD symptoms). By allowing physiological glutamate signaling, while reducing excitability, some neurological functions are restored, such as memory

Day 5: Adverse drug events for [#memantine](https://twitter.com/search?q=%23memantine): Common; psychiatric disorders, somnolence, constipation, liver conditions, headache, impaired balance, dyspnoea. Rare/serious ADRs include VTE, fungal infection, pancreatitis, seizure (not exhaustive)

Day 6: Drug-drug interactions [#memantine](https://twitter.com/search?q=%23memantine); CNS toxicity with concurrent amantadine/ketamine (severe).Can increase effects of levodopa (& other Parkinson’s disease drugs (moderate)) & can increase effects of anti-muscarinics; May increase the anti-coagulant effect of warfarin (in SPC & CKS, but not BNF).Not exhaustive

Day 7: Neurodegeneration re Alzheimer's possibly caused by dysregulation of calcium, increased production of beta amyloid , leading to cell death. Suppressing excessive glutamate signaling via [#memantine](https://twitter.com/search?q=%23memantine) could inhibit this pathological process, & may slow down disease progression (poorly understood).

CPD: in addition to the tweets, read the BNF sections on ‘Dementia’, as well as the monograph on memantine

<https://bnf.nice.org.uk/treatment-summary/dementia.html>

<https://bnf.nice.org.uk/drug/memantine-hydrochloride.html>

Another useful source is the Summary Products Characteristics for memantine

<https://www.medicines.org.uk/emc/product/716/smpc#gref>

CPD questions (most but not all answers will be in the tweets). There is only one correct answer per question

1. Memantine is a drug related to levodopa

TRUE or FALSE

1. Memantine is used in the UK for Alzheimer’s disease, but not for Parkinson’s disease

TRUE or FALSE

1. Which of the following is TRUE?
2. Memantine has poor oral absorption
3. Memantine has some anti-viral action(s)
4. Memantine undergoes extensive phase 1 metabolism in the kidney
5. Memantine has a short half-life
6. Memantine is used on its own and shouldn’t be added to other drugs used for Alzheimer’s disease

TRUE or FALSE

1. Memantine is usually used second line as a treatment for AD

TRUE or FALSE

1. Which best describes the mechanism of action for memantine?
2. It enhances dopamine signalling
3. It restores memory by encouraging re-growth of neurons in the amygdala
4. It calms neuro-excitability by blocking NDMA (glutamate) signal transmission
5. It improves serotonin levels, which helps reduce stress and improve mood
6. Which is a common adverse drug reaction for memantine?
7. Constipation
8. Seizure
9. VTE
10. Pancreatitis
11. Ketamine is also an NMDA antagonist and if used together with memantine, CNS toxicity can result

TRUE or FALSE

1. Memantine blocks all glutamate signalling

TRUE or FALSE

1. It is hoped that memantine an slow down AD progression, but the clinical evidence for this is weak

TRUE or FALSE