

Case 1



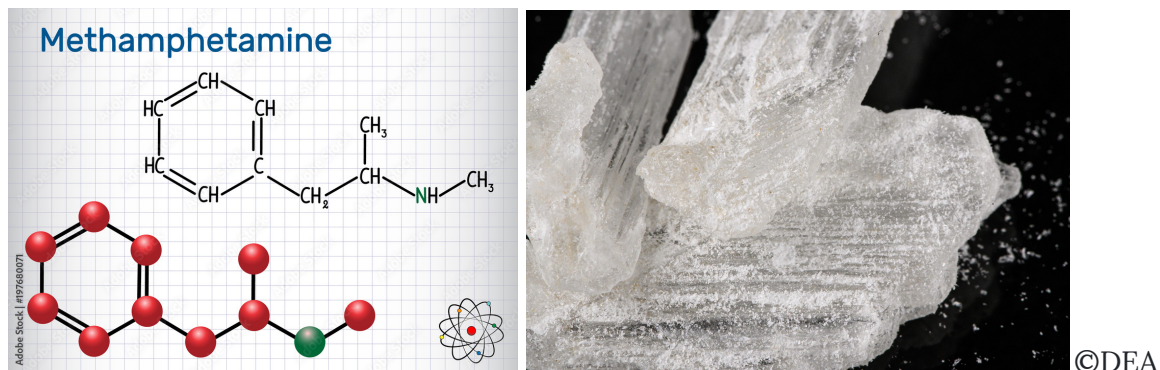
2025

EX3

Medicine

Case 1

Crystal meth or crystal methamphetamine (pictured below) is a highly addictive synthetic drug that considerably affects the central nervous system. It is known for its potent psychoactive effects, which include increased energy, heightened sexual arousal, and reduced inhibitions. The drug can be consumed in various ways, including smoking, injecting, or ingesting, and it poses severe health risks, including neurotoxicity and cardiovascular complications



Crystal methamphetamine use in Canada has seen a significant increase, especially in British Columbia. For example, in Vancouver, reported use increased from 19% in 2006 to 36% in 2017 (Bach, P, Hayashi, K, Milloy, M-J, Nosova, E, Kerr, T, Wood, E, & Fairbairn, N 2020, 'Characterising the increasing prevalence of crystal methamphetamine use in Vancouver, Canada, from 2006-2017: A gender-based analysis', *Drug and Alcohol Review*, vol. 39, no. 7, pp. 932-940. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/dar.13126>).

Answer the following in questions in full sentences or jotnote form:

- A) Why do people get addicted to methamphetamine and other similar substances?
Give five reasons. (10 marks)

- B) What measures can be taken to deal with the festering problem of the increase in crystal meth use? (10 marks)

Judge Copy Case 1



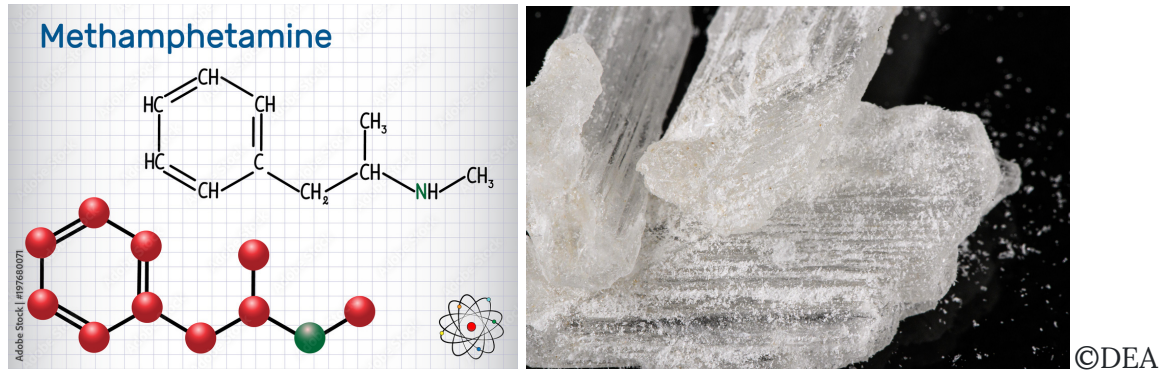
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EX3

Medicine

Case 1

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Answer the following in questions in full sentences or jotnote form:

- C) Why do people get addicted to methamphetamine and other similar substances?
Give five reasons. (10 marks)

+3 marks for each of the following:

Hedonia Hypothesis: Dopamine is the pleasure neurotransmitter and drugs often increase dopamine levels/ drugs can be source of pleasure or stress coping mechanism for people/ similar responses

Incentive sensitization model: “Under their model of drug use, initially a person takes a drug because they like the positive, euphoria-producing side effects of the substance. But after chronic exposure to the substance, the person becomes fixated on obtaining the drug rather than how the drug makes them feel. At this point, they continue to use the drug even though they no longer enjoy the drug to the same degree that they once did. Instead of “liking” the drug, the user fixates on “wanting” the drug.” / similar responses

Brain Disease model of addiction: genetic predisposition to take drugs/ drugs cause neurobiological change, which perpetuates addiction/ any combination or similar version of the two

Biopsychosocial model: A Combination of biological, sociological, and psychological factors cumulating in drug addiction (+3 is not gained if the combination is not explicitly stated)

+2 marks for the following:

Psychological model: Psychological trauma causes drug use/ similar response

+1 marks for the following:

Spiritual model: lack of meaning in life causes drug usage/similar response

Peer pressure

Parental usage

+0 marks for the following:

Weak responses such as “some areas have greater availability of drug dealers than others”

-3 marks for the following:

Moral model: People use drugs due to immorality

MAXIMUM 10 MARKS

A) What measures can be taken to deal with the festering problem of the increase in crystal meth use? (10 marks)

+2 for each of the following:

Educational programs

Rehabilitation

Drug dealer prosecution

Investment in/doing of sociological research in drug addiction

Research in finding medications to treat drug abuse

Evidence-based policy development

+1 for each noteworthy detail added

MAXIMUM OF 10 MARKS

Case 2



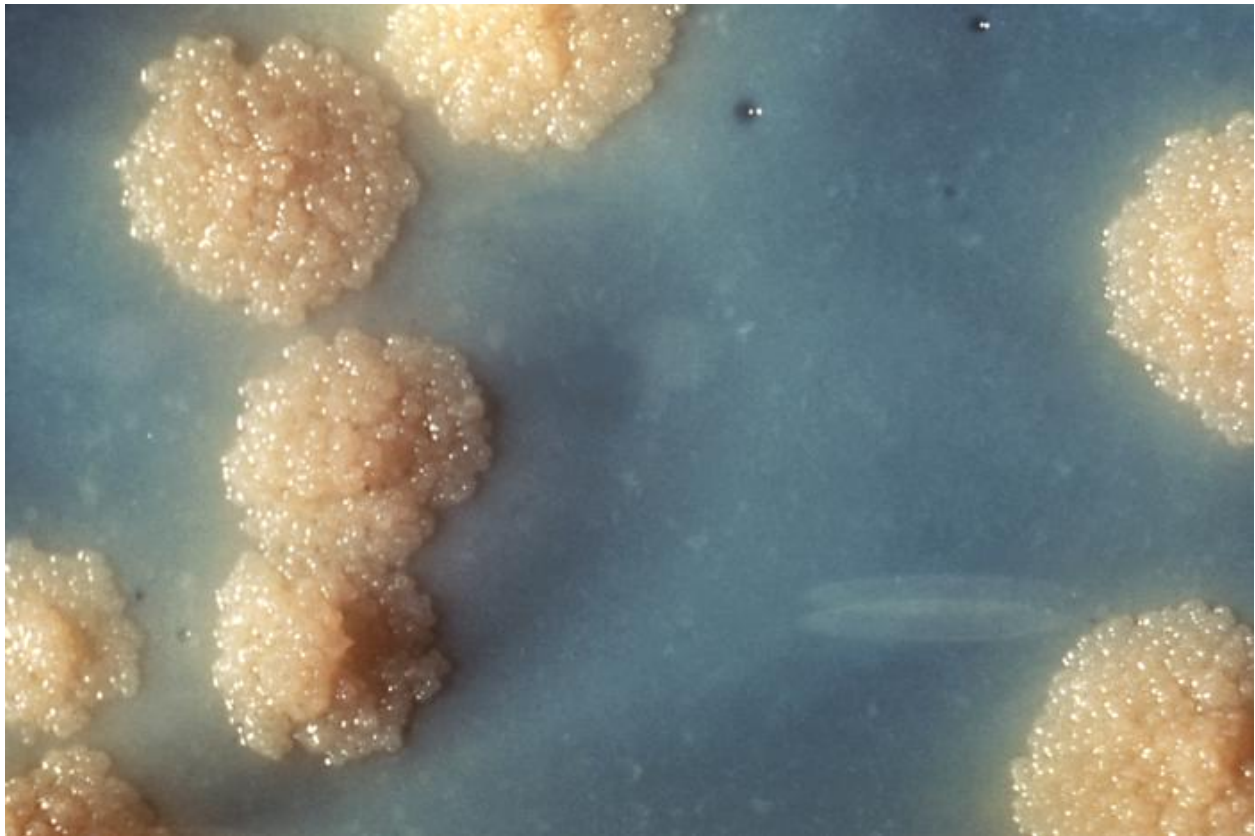
2025

EX3

Medicine

Case 2

Mycobacterium TB, aptly dubbed the "white death," claimed the lives of almost 1.25 million people in 2023. Airborne tubercle bacilli are responsible for the transmission of tuberculosis. If the bacilli survive the initial innate immune response, they first divide in alveolar macrophages before spreading to neighbouring endothelium and epithelial cells and possibly lymphatic cells in other organs. Following the activation of the adaptive immune response, immune cells surround the bacterium in a calcified granuloma known as a Ghon's complex (and Ranke's complex following calcification). These may result in a subsequent tuberculosis infection since they contain live germs.



Fleming and others tested penicillin against Mycobacterium tuberculosis when it was discovered. Because the mycolic acid-rich cell wall was impervious to penicillin, it was totally ineffective. Only in 1942 did the renowned scientist Albert Schatz discover streptomycin, an antibiotic that inhibits ribosomal 30s and causes protein miscoding. When it came to treating tuberculosis, streptomycin was very effective. Another antibiotic that worked well against tuberculosis was isoniazid, which worked by producing reactive oxygen species. However, while inactivating mutations of katG generated resistance to isoniazid and mutations in rpsL, gid, and rrs, which encode ribosomal protein and RNA, induced resistance to streptomycin, resistance rapidly developed as a result of natural

selection. The introduction of later antibiotics like rifampin, which inhibited RNA polymerase 1, saved many lives. John Crofton eventually created the Edinburgh technique for treating tuberculosis, a combination regimen of streptomycin, isoniazid, and PAS. Multidrug-resistant tuberculosis that was resistant to both isoniazid and rifampin was reported by the WHO in 1993. Delamanid, which inhibits the synthesis of mycolic acid, bedaquiline, which inhibits ATP synthase, and fluoroquinolones, which inhibit DNA gyrase, are among the current generation of medications used to treat tuberculosis. Nevertheless, there have been reports of *Mycobacterium tuberculosis* strains that are resistant to each of these medications. Several months of different antibiotic regimens and close observation of drug resistance are part of the current medication therapy strategy for tuberculosis (Li, Y, Cai, R-J, Talbot, EA, & Wang, Y-T 2024, 'Mycobacterium tuberculosis', in, pp.1569-1584. Elsevier BV).

Answer the following in questions in full sentences or jotnote form:

1) What are some strategies for tuberculosis prevention and treatment? (20 marks)

Judge Copy Case 2



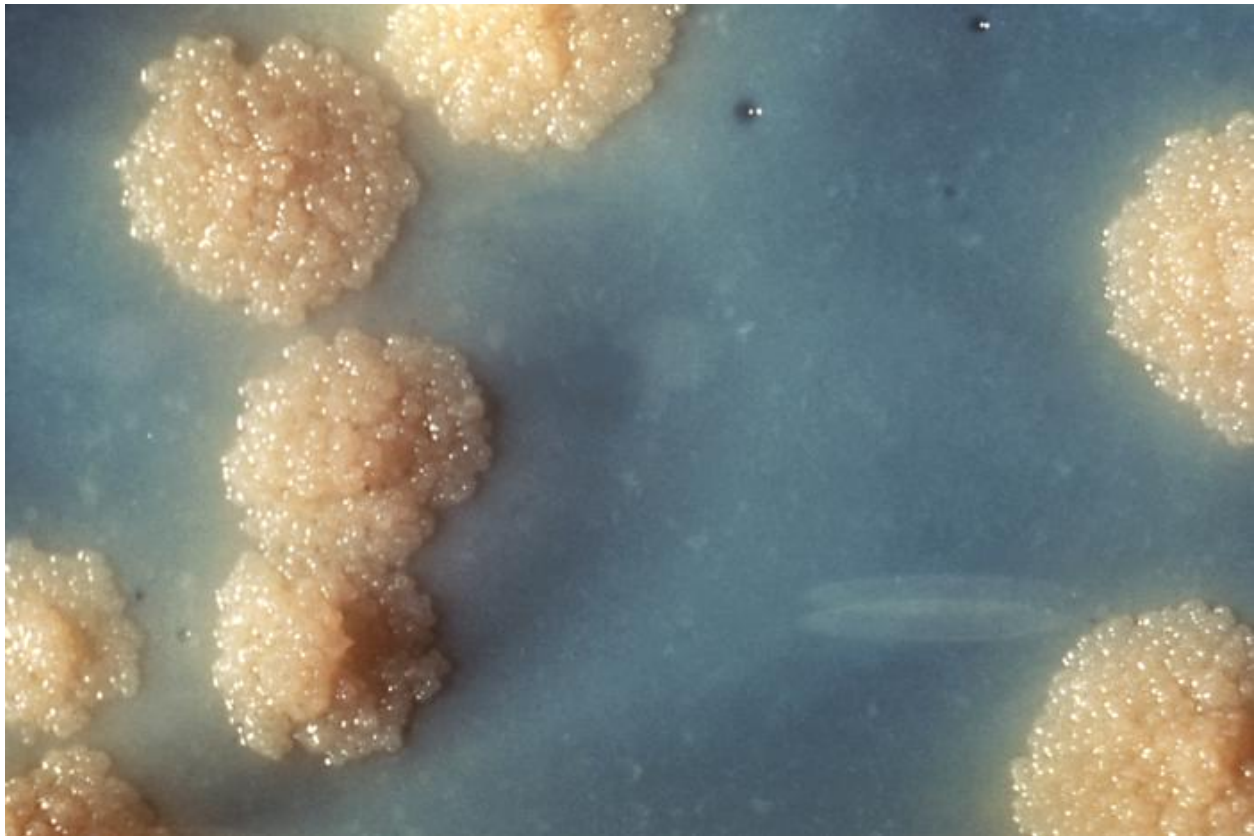
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Answer the following in questions in full sentences or jotnote form:

1) What are some strategies for tuberculosis prevention and treatment? (20 marks)

+5 for each of the following:

Screen for/research about/use novel antibiotics

Research on/utilisation of bacteriophages

BCG vaccine for tuberculosis/more vaccine development

Use antibiotic combinations to prevent resistance

+3 for each of the following:

Monitor for drug resistance

Monitor cases of tuberculosis/quarantine patients/contact tracing

Mask wearing

+2 for each of the following:

Social distancing

Community education

Lockdown in case of an outbreak

siRNA/CRSIPR/novel gene knockdown or knockout therapies

MAXIMUM 20 MARKS