


Personal responsibility of scientists in relation to dual-use research

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presented at :

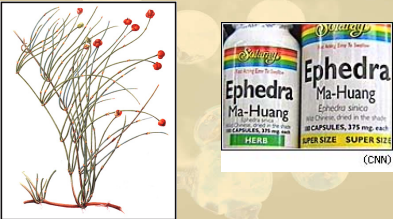
STCU webinar

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A Chemical Plant

Multiple Uses of Chemicals




A Chemical Plant

Buy Ephedra Here!
Strongest formulas on the market!

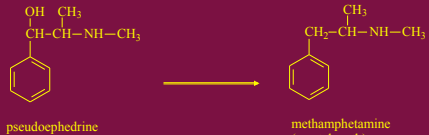
Misuse of Chemicals
ephedra extracts banned as
diet supplements in several
countries

Triple Stack

- Ephedra
- Caffeine
- Aspirin (ASA)





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CC(N)C(O)c1ccccc1
pseudoephedrine
(cough suppressant)

CC(N)C)c1ccccc1
methamphetamine
(crystal meth)



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Curious → Misconduct → Criminal

Non-intentional

Curiosity
Can (suspect) chemical be made?
Suppress knowledge
Make it again
Sell some
????

Intentional

With apologies to M. Nylen & S. Simonsen
Lancet 2006; 367: 1882-4

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Role play

- Divide into groups of three
- Exercise for 5-10 minutes
- Azerbaijan - chemist
- Georgia - buyer
- Moldova - partner
- Assume the following roles:
- Crystal meth producer (the student)
- A friend who wants to buy some
- Girl/Boyfriend/Partner who wants him to sell

Let's hear your arguments / pleas / disappointments

Outcome

- Groups report to main forum on their position
- Should s/he sell Crystal Meth?
- If so, are there any constraints / concerns

New research findings

- Novel synthesis of new chemical – energy efficient, wide range of possible applicationsdo you publish?
- Are there ever any constraints? If so, what are they?
- The chemical you synthesized, whilst new, can be modified easily to something similar to a toxic nerve agent.... Do you publish?

Isopropanol

- Should you ever restrict its sale/use?
- What are its uses?
- Precursor for nerve agent sarin.... any restrictions now?

Not just old fiction

Chemistry professors arrested for allegedly making meth [Crystal Meth or methamphetamine]

<https://edition.cnn.com/videos/us/2019/11/17/arkansas-professors-arrested-meth-dnt-vpx.katv>

Pseudo-Ephedrine/Crystal Methamphetamine



Case Study: Pseudoephedrine/Methamphetamine

Methamphetamine, also known as "crystal meth" and "speed", is a powerful stimulant central nervous system (CNS) drug.

Historically, meth has been derived from an extract of *Methylenes*, a North American evergreen shrub of the genus *Ephedra*. It has been used traditionally in traditional Chinese medicine for over 5000 years to treat cold, asthma, hay fever, and various forms of asthma, including a use of the dried root of *Methylenes*.

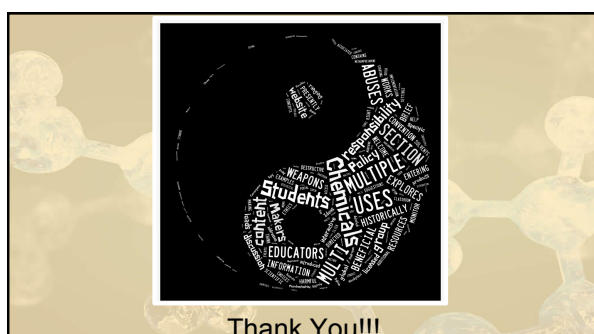
Unfortunately, the same properties that have made this drug an effective medicine have inspired its misuse. For example, it is used to suppress the cough reflex. It is used to increase alertness or to suppress appetite, and is also used as a stimulant in the lab, where it is used to increase the rate of synthesis of various compounds.

Chemical Structures:
 Pseudoephedrine: CC(N)C(O)C1=CC=C(C=C1)O
 Ephedrine: CC(N)C(O)C1=CC=C(C=C1)O

<http://www.iupac.org/multiple-uses-of-chemicals>

Lessons

- As scientists you have a choice about what you decide to do.
- There are laws / rules / guidelines / codes-of-conduct but, ultimately, how you practice is down to you.



Thank You!!!
