

A photograph of a red mushroom with white spots, likely a fly agaric, growing in a field of dry grass. The mushroom has a bright red cap with numerous white, irregular spots. The stem is thick and appears to have a white or light-colored base. The background is a dense field of dry, yellowish-brown grass.

Inhalation Anaesthetic Agents

inhalation anaesthesia

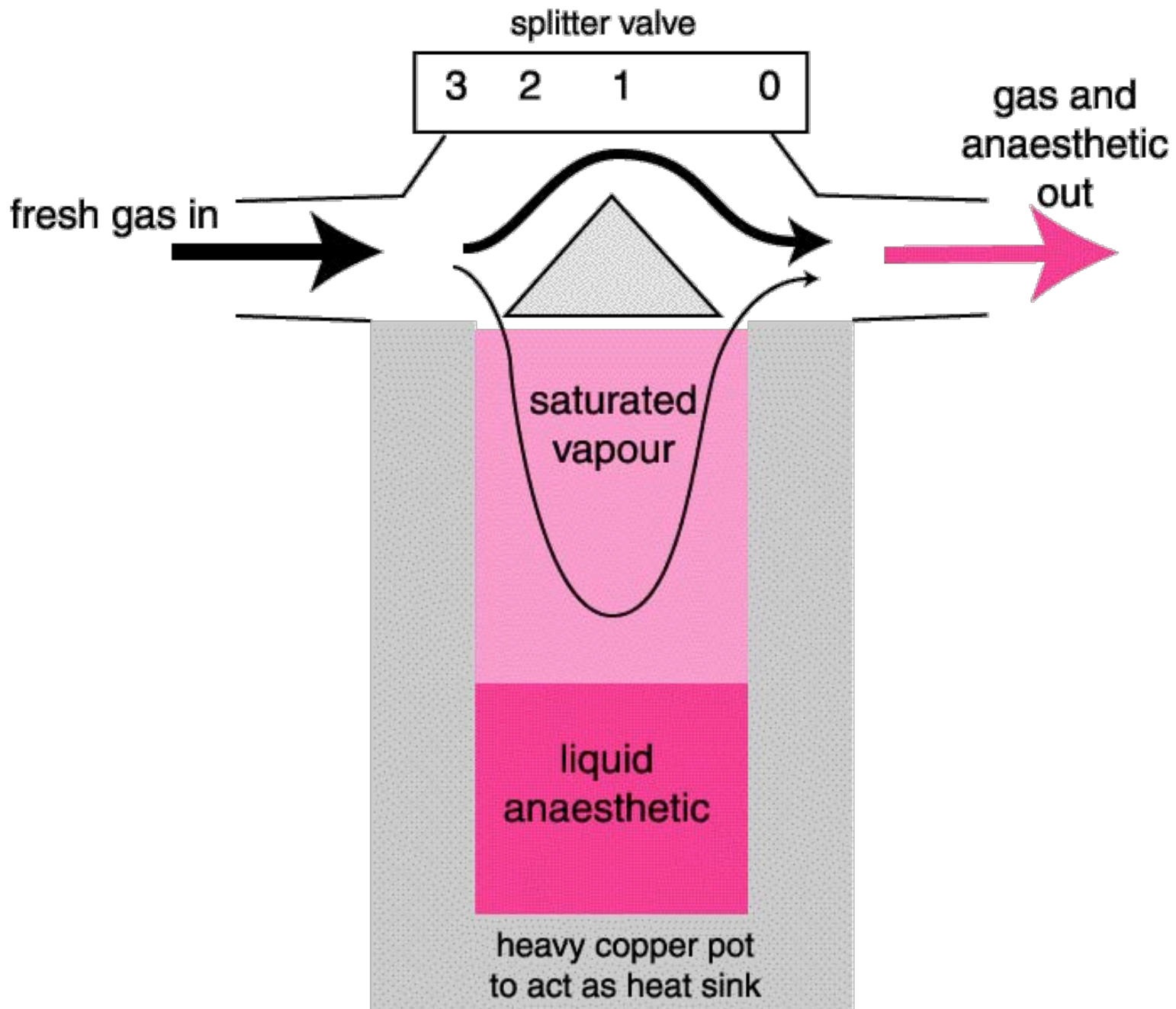
- control of
 - airway
 - ventilation
 - drugs going in and out
- expensive machinery
- equipment failure

administration

- effects are dose dependant
- understand how equipment works!
 - 90% of anaesthetic equipment in practice in NZ has faults!!!

uptake & elimination

- **physical factors**
 - saturated vapour pressure
 - rubber solubility
 - blood gas coefficient
 - blood brain coefficient



uptake & elimination

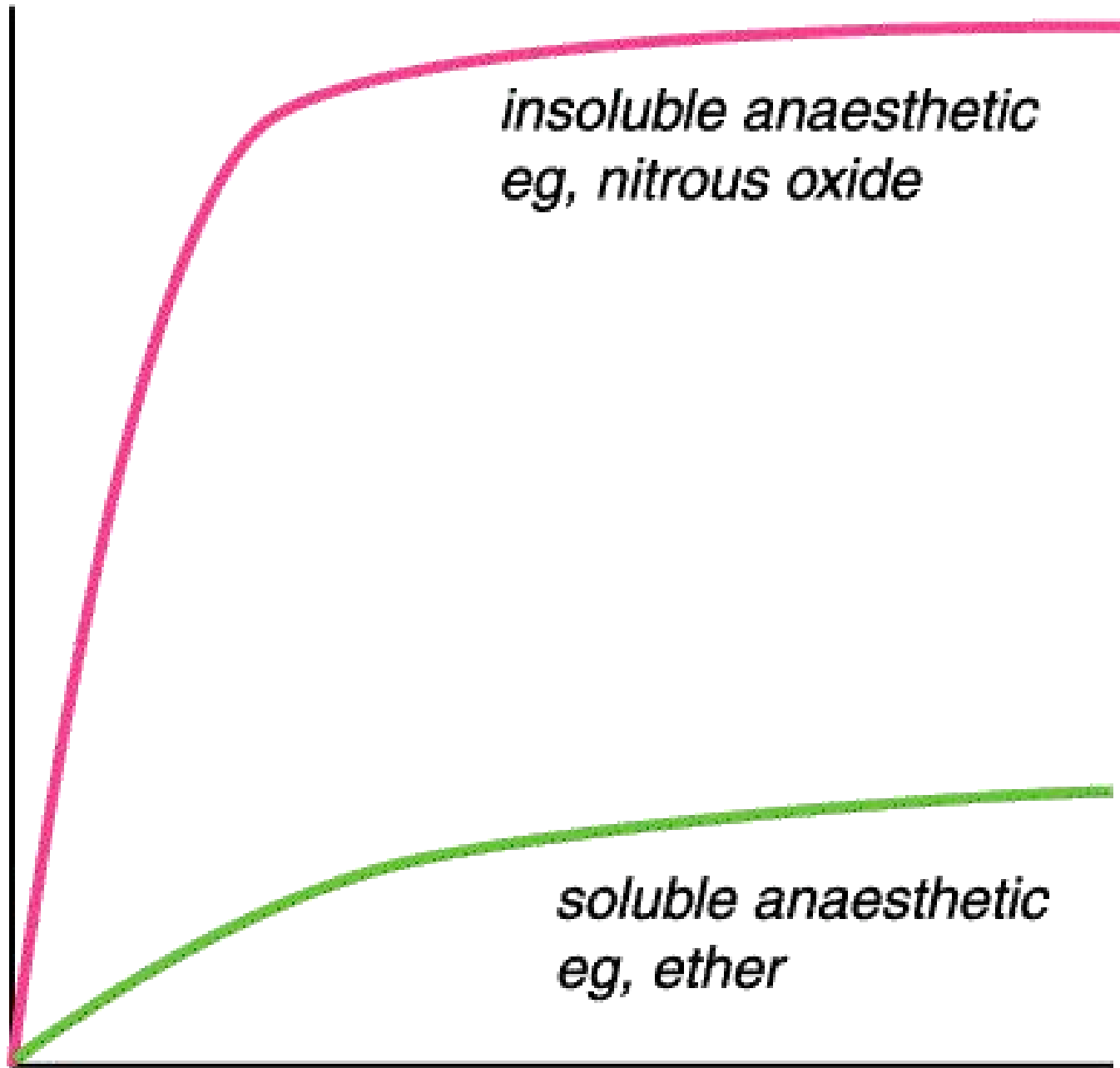
- **physical factors**
 - saturated vapour pressure
 - rubber solubility
 - blood gas coefficient
 - blood brain coefficient

alveolar conc / inspired conc

*insoluble anaesthetic
eg, nitrous oxide*

*soluble anaesthetic
eg, ether*

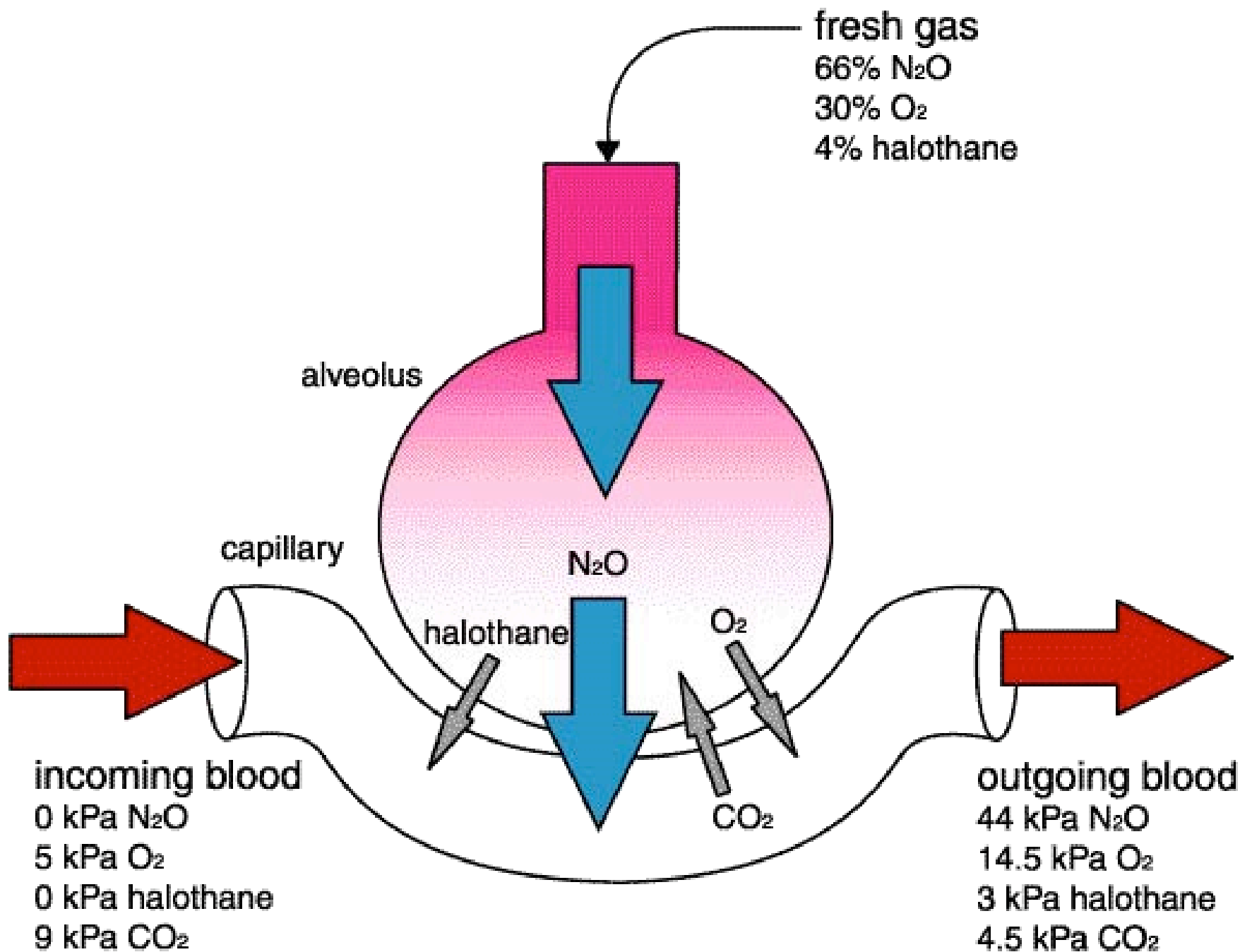
time



uptake & elimination

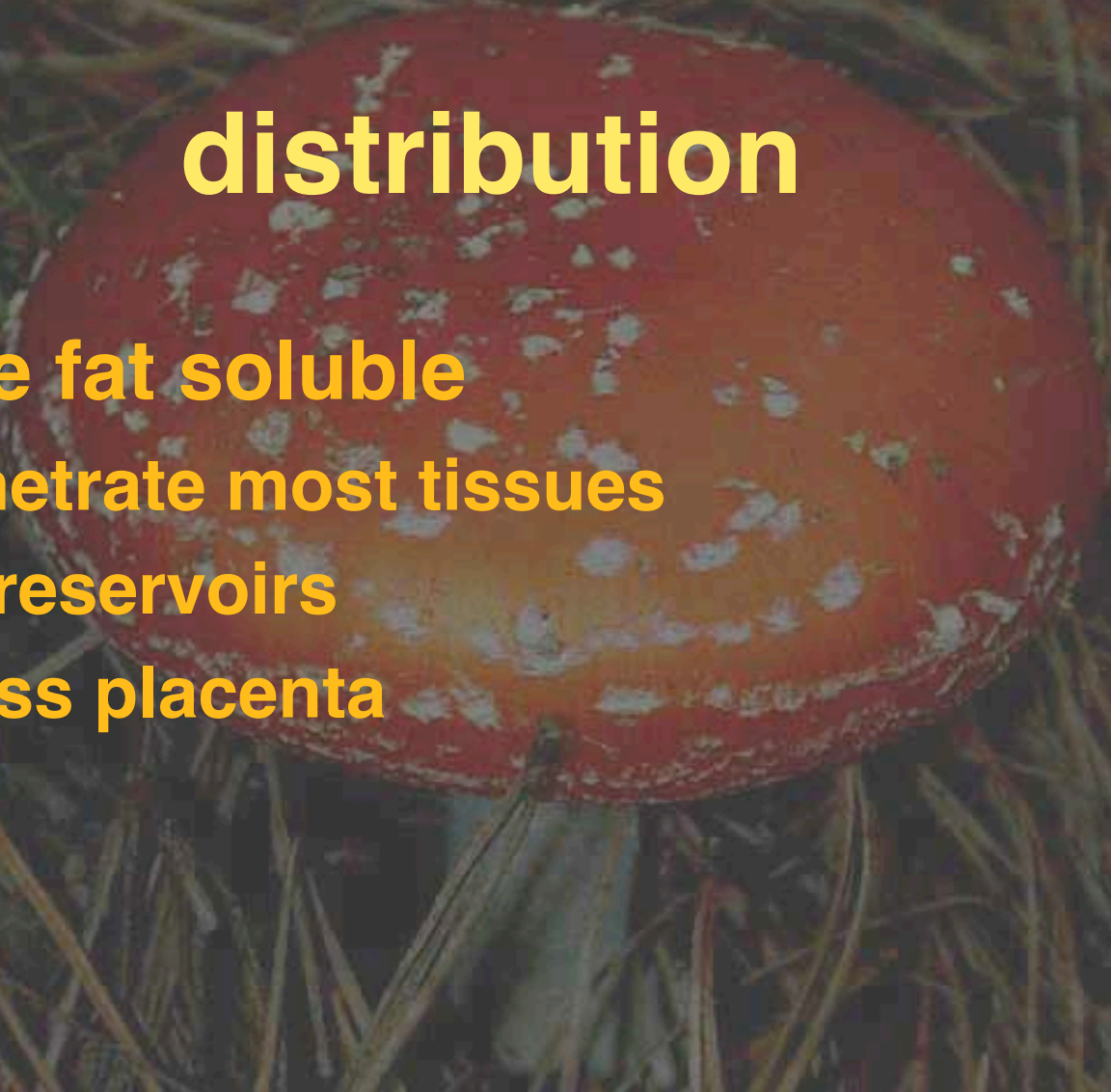
A red mushroom with white spots, likely an Amanita muscaria, is growing in a field of dry grass. The mushroom is the central focus of the image, with its bright red cap and white spots contrasting sharply with the dry, yellowish-brown grass. The background is slightly blurred, emphasizing the mushroom.

- other factors
 - ventilation
 - cardiac output
 - lung disease
 - second gas effect



distribution

- all are fat soluble
 - penetrate most tissues
 - fat reservoirs
 - cross placenta



MAC

- **minimum alveolar concentration**
 - the concentration in the alveolus at a steady state which will prevent purposeful movement in response to a supramaximal stimulus in 50% of animals

drugs

A red mushroom with white spots, resembling a fly agaric, is the central focus of the image. It is growing in a field of dry, yellowish-brown grass. The mushroom has a bright red cap with numerous white, irregular spots. The stem is white and appears to have a slight constriction near the base. The overall lighting is soft, and the colors are somewhat muted, giving the image a slightly somber or mysterious feel.

- gases
- halogenated hydrocarbons
- ethers

A red mushroom with white spots, likely an Amanita muscaria, is growing in a field of dry, yellowish-brown grass. The mushroom has a bright red cap with numerous white, irregular spots. Its stem is thick and appears to have a white, scaly texture. The background is a dense field of dry grass, creating a textured, natural setting.

gases

- **nitrous oxide**
- **xenon**
- **cyclopropane**

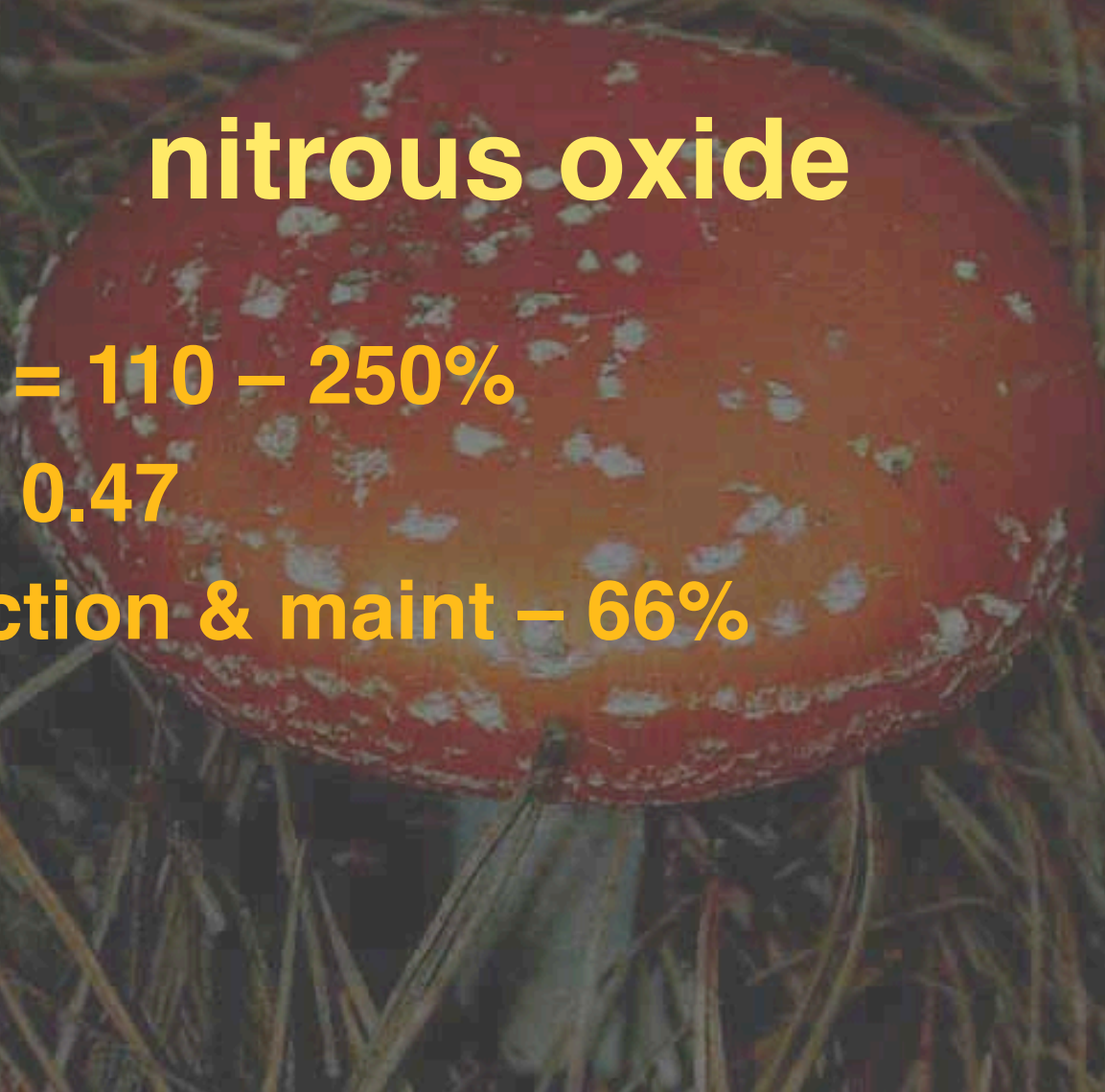
oxides of nitrogen

A red mushroom with white spots, resembling a fly agaric, is centered in the background. It has a bright red cap with numerous white, irregular spots and a thick, white, slightly wrinkled stem. The mushroom is growing in a field of dry, yellowish-brown grass.

- **NO**
 - nitric oxide – vasodilator
- **N₂O**
 - nitrous oxide – anaesthetic
- **NO₂**
 - nitrogen dioxide – environmental pollutant

nitrous oxide

- MAC = 110 – 250%
- BG = 0.47
- induction & maint – 66%



nitrous oxide

A red mushroom with white spots, resembling Amanita muscaria, growing in a field of dry grass. The mushroom is the central focus of the image, with its bright red cap and white spots contrasting sharply with the dry, brownish-yellow grass. The background is a dense field of similar grass, creating a textured, natural setting.

- **pro**
 - good analgesic
 - fast induction
- **con**
 - diffusion into gas filled spaces
 - Fink effect
 - circle systems
 - folate metabolism

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gases

- **nitrous oxide**
- **xenon**
- **cyclopropane**

hydrocarbons

A red mushroom with white spots, likely an Amanita muscaria, is growing in a field of dry, brown grass. The mushroom is the central focus of the image, with its bright red cap and white spots contrasting sharply with the dry, textured background of the grass. The lighting is natural, highlighting the texture of the mushroom's cap and the dryness of the surrounding vegetation.

- **halothane**
- **chloroform**
- **trichloroethylene**

halothane

- **MAC = 0.9**
- **BG = 2.4**
- **svp = 33 kPa**
- **induction – 2 – 5%**
- **maintenance – 0.5 – 2%**

halothane side effects

- **respiratory depression**
- **reduced cardiac output**
- **vasodilatation**
- **sensitises heart to adrenaline**
- **(halothane hepatitis)**
- **(malignant hyperthermia)**

halothane hepatitis

- about 1:10,000 people
- more likely if previously exposed
- not confined to halothane



malignant hyperthermia

- **mainly pigs**
- **rarely horses**
- **recorded in dogs**



MH treatment?



MH treatment

- turn off halothane
- provide 100% oxygen
- cool down
- give dantrolene

hydrocarbons

A red mushroom with white spots, likely an Amanita muscaria, is growing in a field of dry, brown grass. The mushroom is the central focus of the image, with its bright red cap and white spots contrasting sharply with the dry, textured background of the grass. The lighting is natural, highlighting the texture of the mushroom's cap and the surrounding vegetation.

- **halothane**
- **chloroform**
- **trichloroethylene**

A red mushroom with white spots on a grassy background. The mushroom is the central focus, with its cap showing a vibrant red color and numerous white, irregular spots. The background consists of dry, brownish grass and some green blades, creating a natural, outdoor setting. The overall image has a slightly dark, muted tone, typical of a presentation slide background.

ethers

- diethylether
- isoflurane
- enflurane
- methoxyflurane
- sevoflurane
- desflurane

ether

- mac = 3%
- BG = 12
- svp = 59 kPa
- induction – as much as possible
- maintenance – 3 – 10%

isoflurane

- **MAC = 1.9%**
- **BG = 1.4**
- **svp = 32 kPa**
- **induction – 2 – 3%**
- **maintenance – 0.5 – 2.5%**

sevoflurane

- **MAC = 2.5%**
- **BG = 0.6**
- **svp = 21 kPa**
- **induction – 5 – 7%**
- **maintenance – 0.5 – 3%**

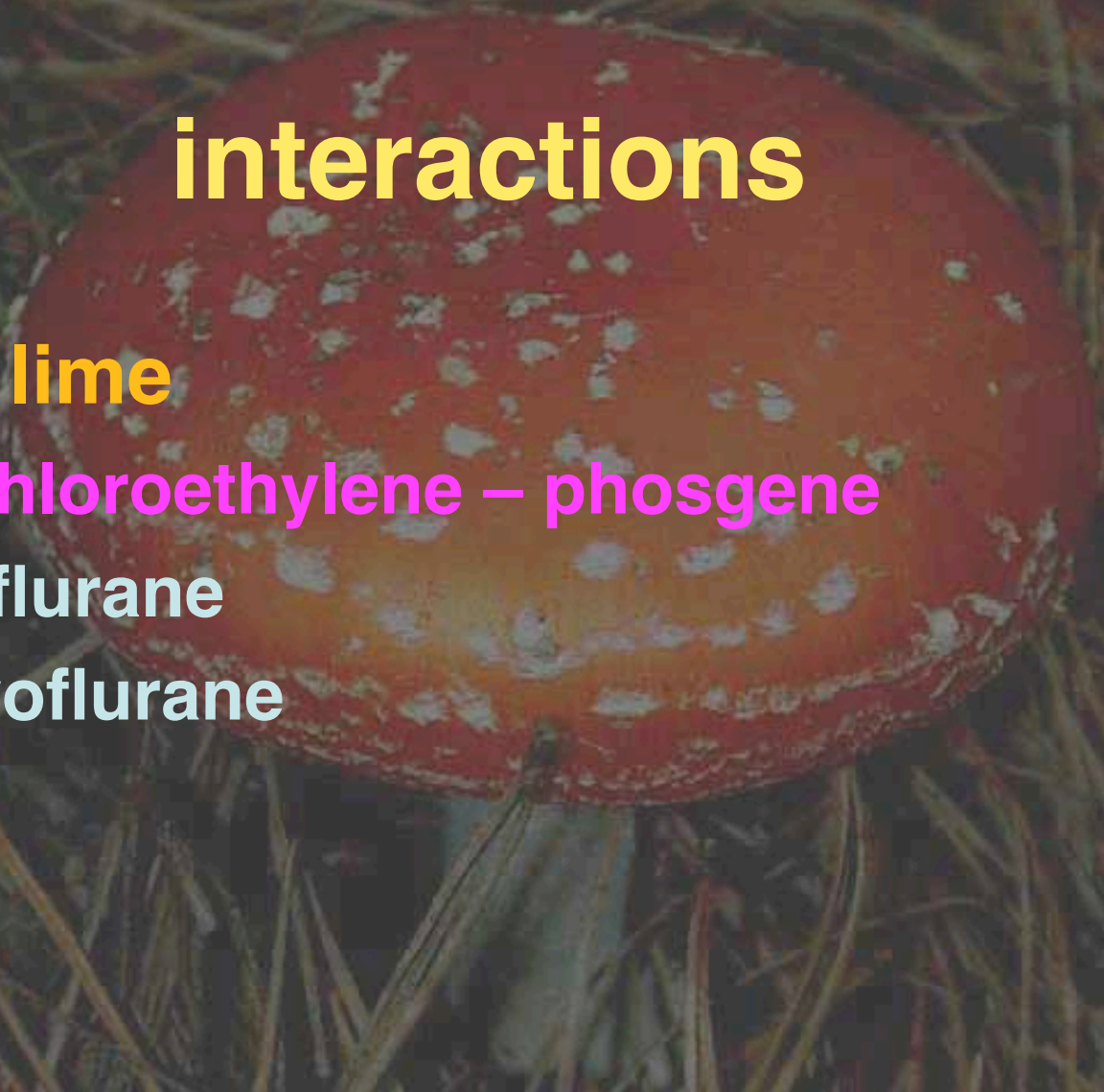
A red mushroom with white spots on a bed of dry grass. The mushroom is the central focus, with its cap showing a vibrant red color and numerous white, irregular spots. The stem is thick and white. The background is a dense layer of dry, brown grass.

ethers

- diethylether
- isoflurane
- enflurane
- methoxyflurane
- sevoflurane
- desflurane

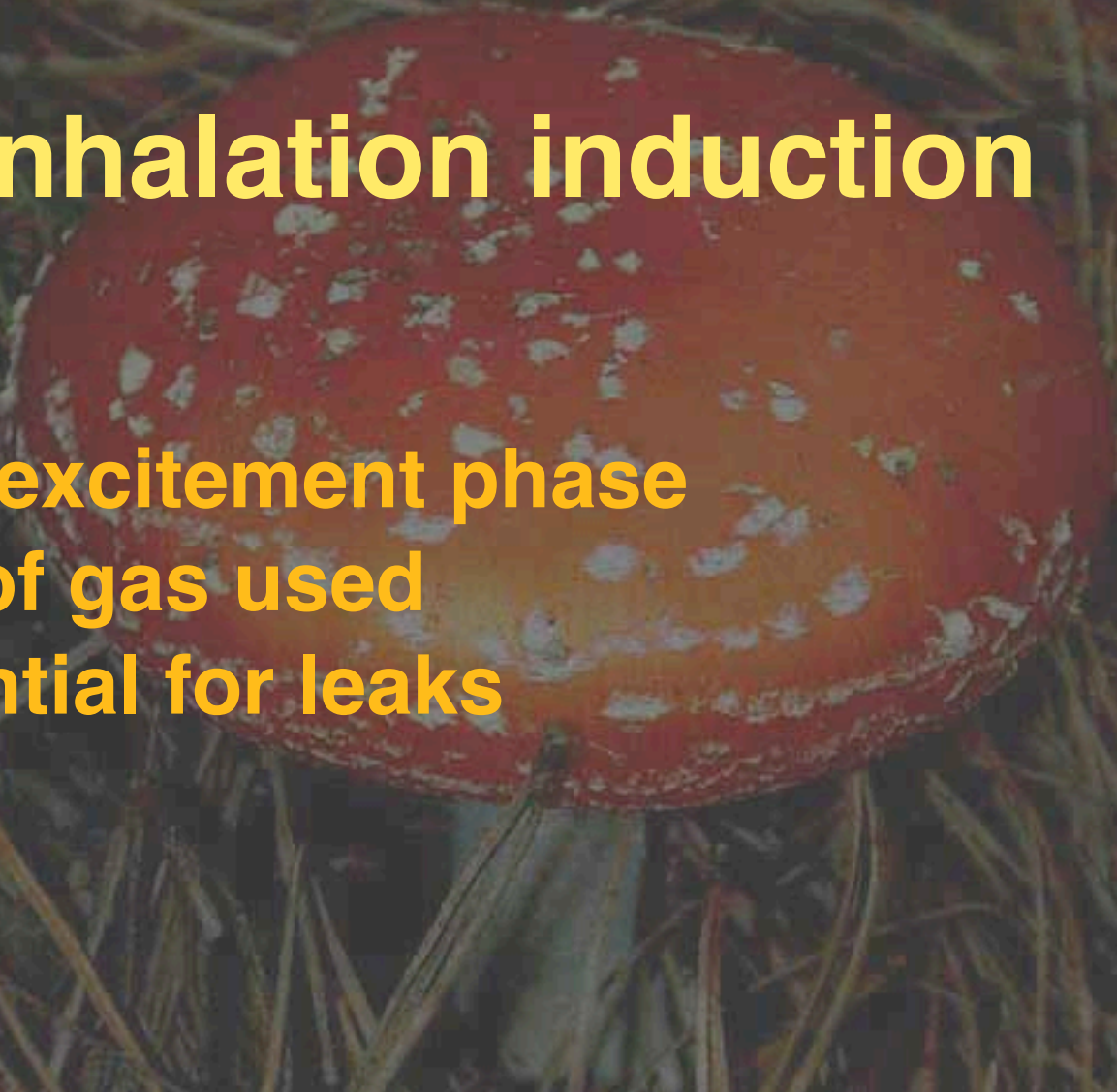
interactions

- **soda lime**
 - trichloroethylene – phosgene
 - isoflurane
 - sevoflurane



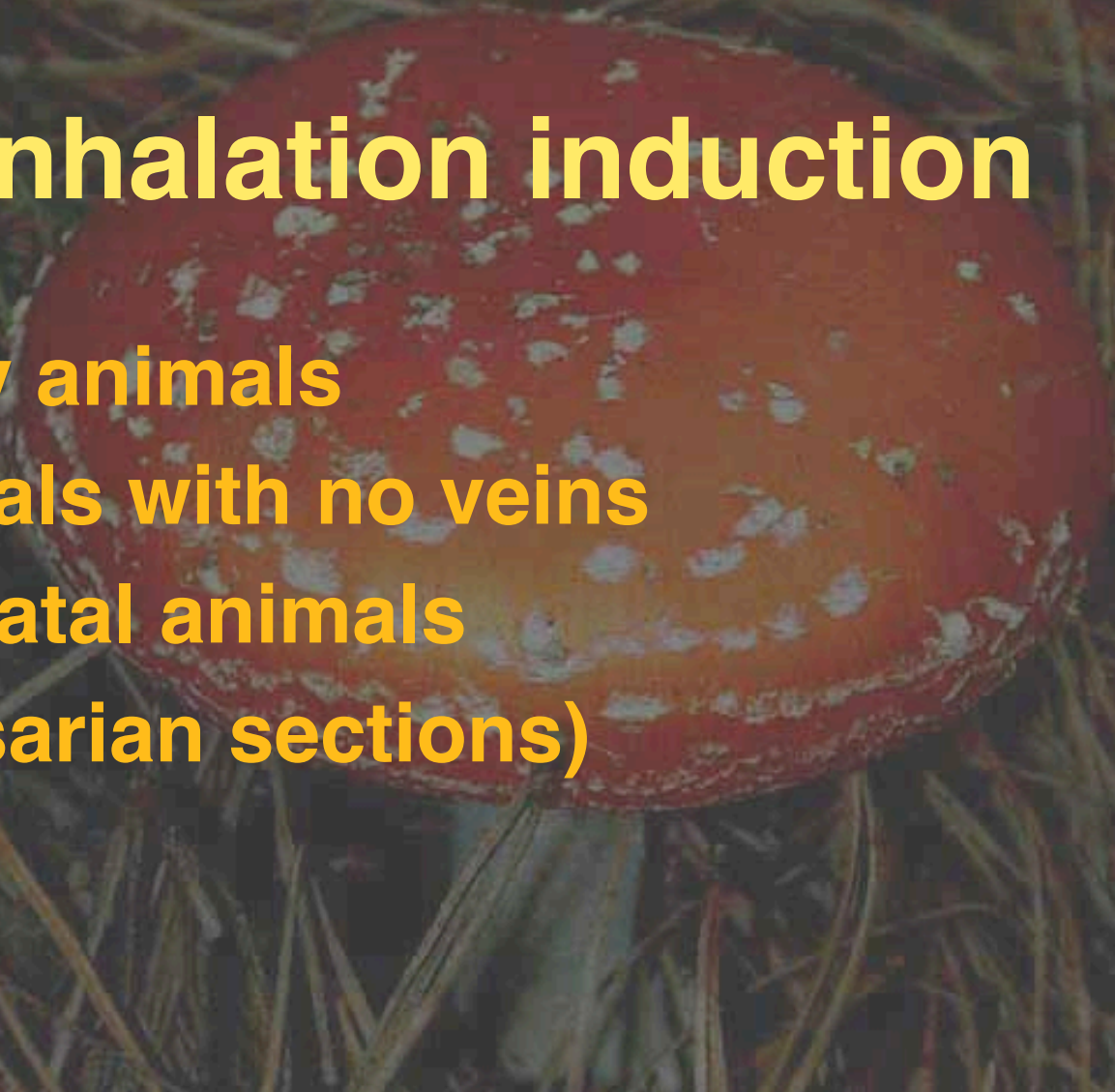
inhalation induction

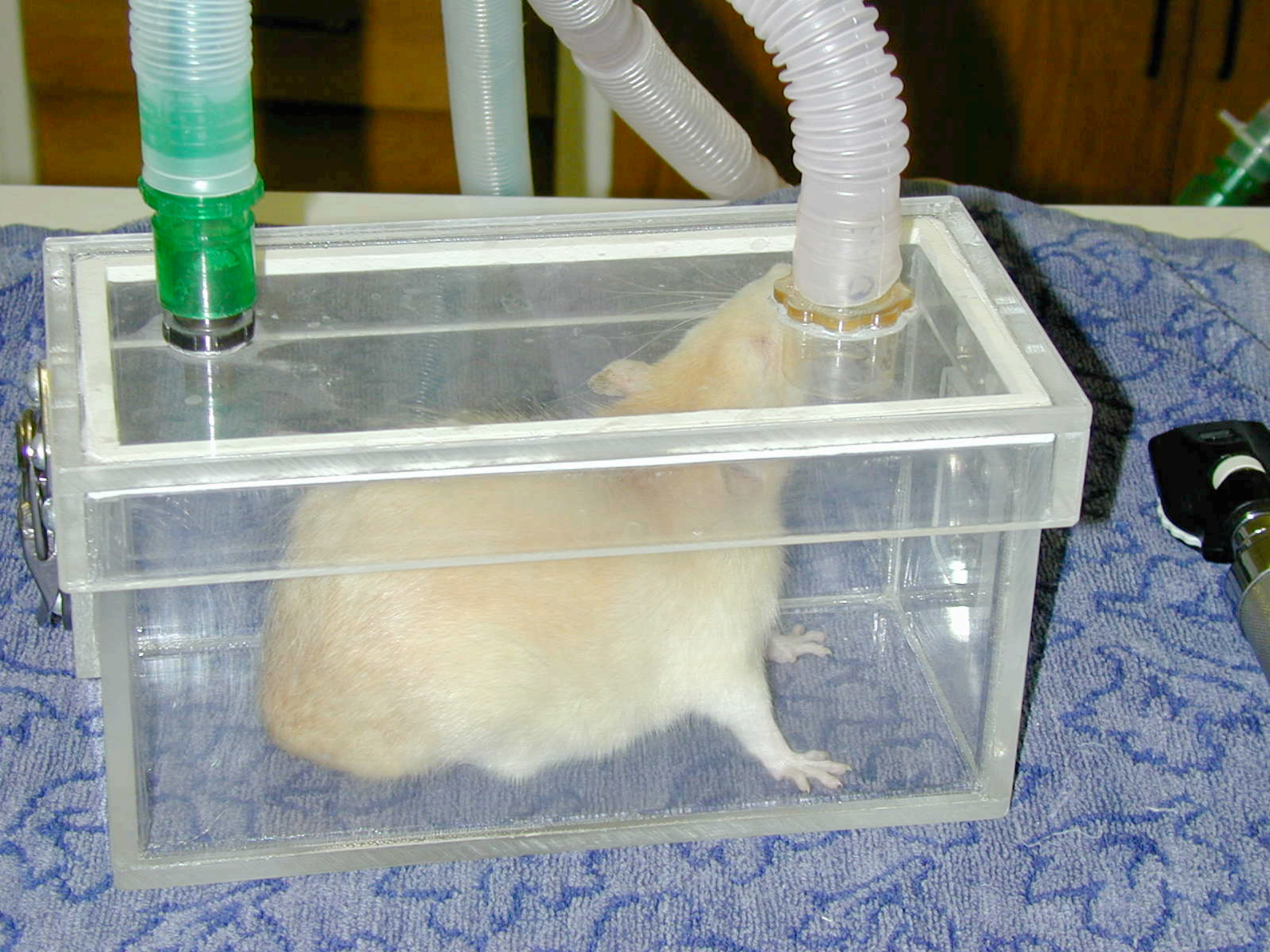
- slow
- long excitement phase
- lots of gas used
- potential for leaks



inhalation induction

- **nasty animals**
- **animals with no veins**
- **neonatal animals**
- **(caesarian sections)**



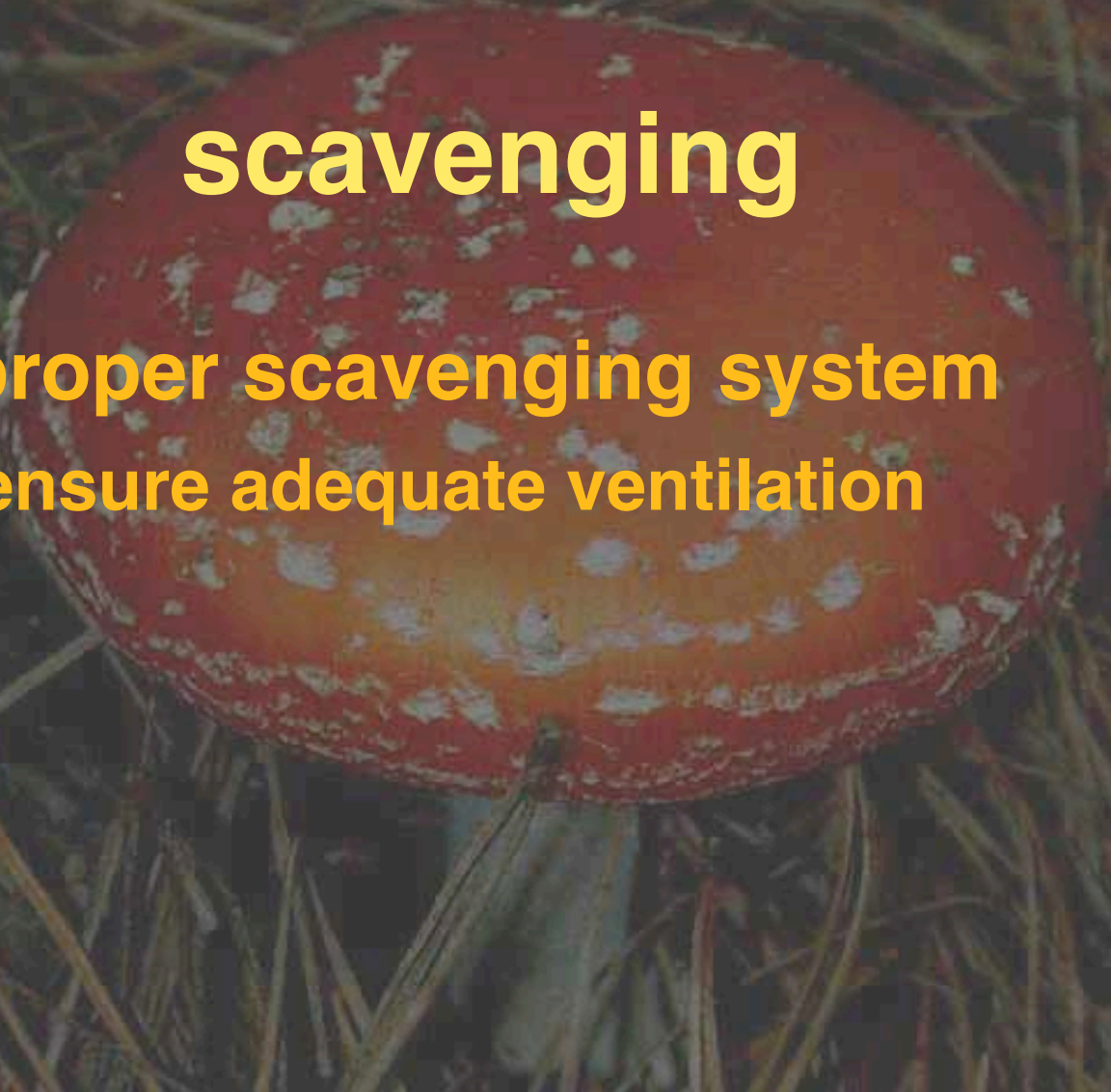






scavenging

- use proper scavenging system
 - or ensure adequate ventilation



scavenging

- **vaporiser filling**
 - use a well ventilated place
 - do not spill any!
 - fill at end of day
- **check machine for leaks**
- **use low fresh gas flows**

fish anaesthesia

- tricaine (MS222)
- benzocaine
- phenoxyethanol
- “Aqui S”
- ether



What would you do?



- 14 year old dog
- fibrosarcoma on jaw
- recurred after surgery
- in for radiotherapy

inhalation anaesthetics

- used to maintain anaesthesia after induction with injectable drug
- relatively insoluble drugs produce a relatively fast induction and recovery
- halothane produces dose dependent respiratory and cardiovascular depression but not much analgesia
- drugs are eliminated by respiration – in overdose, ventilate with 100% oxygen