

A photograph of a red mushroom with white spots, likely a Amanita muscaria, growing on a bed of dry grass. The mushroom is the central focus, with its bright red cap and white spots contrasting sharply with the dry, brownish grass. The text 'Inhalation Anaesthetic Agents' is overlaid in yellow on the mushroom's cap.

Inhalation Anaesthetic Agents

A red mushroom with white spots is centered in the image, resting on a bed of straw. The mushroom has a bright red cap with several white, irregular spots. The straw is dry and light brown, creating a textured background. The overall lighting is somewhat dim, giving the scene a natural, outdoor feel.

**by the end of this lecture you
should be able to**

- **plan an appropriate inhalation anaesthetic protocol for any animal**

What would you do?



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

inhalation anaesthesia

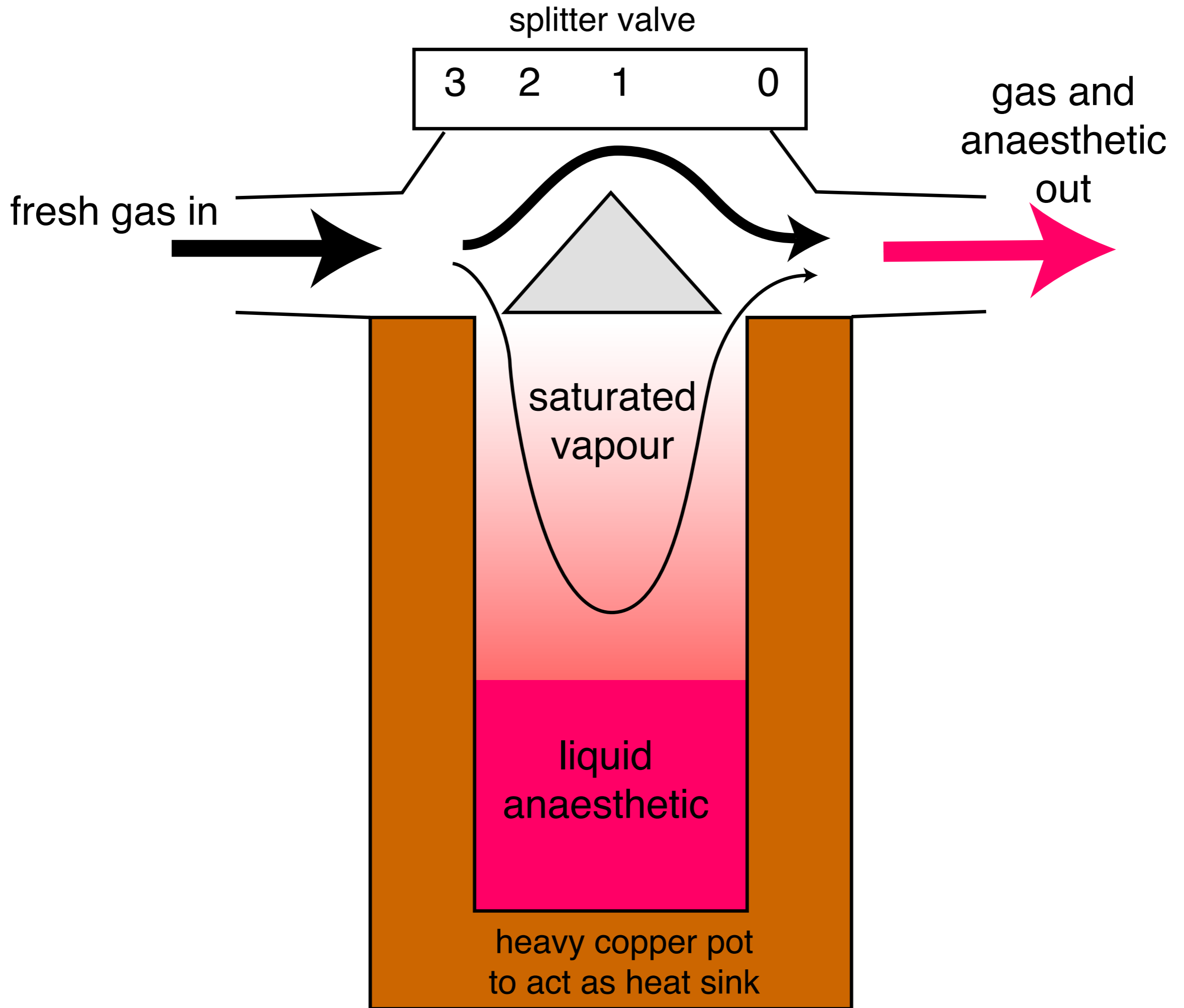
- **control of**
 - **airway**
 - **ventilation**
 - **drugs going in and out**
- **expensive machinery**
- **equipment failure**

administration

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

uptake & elimination

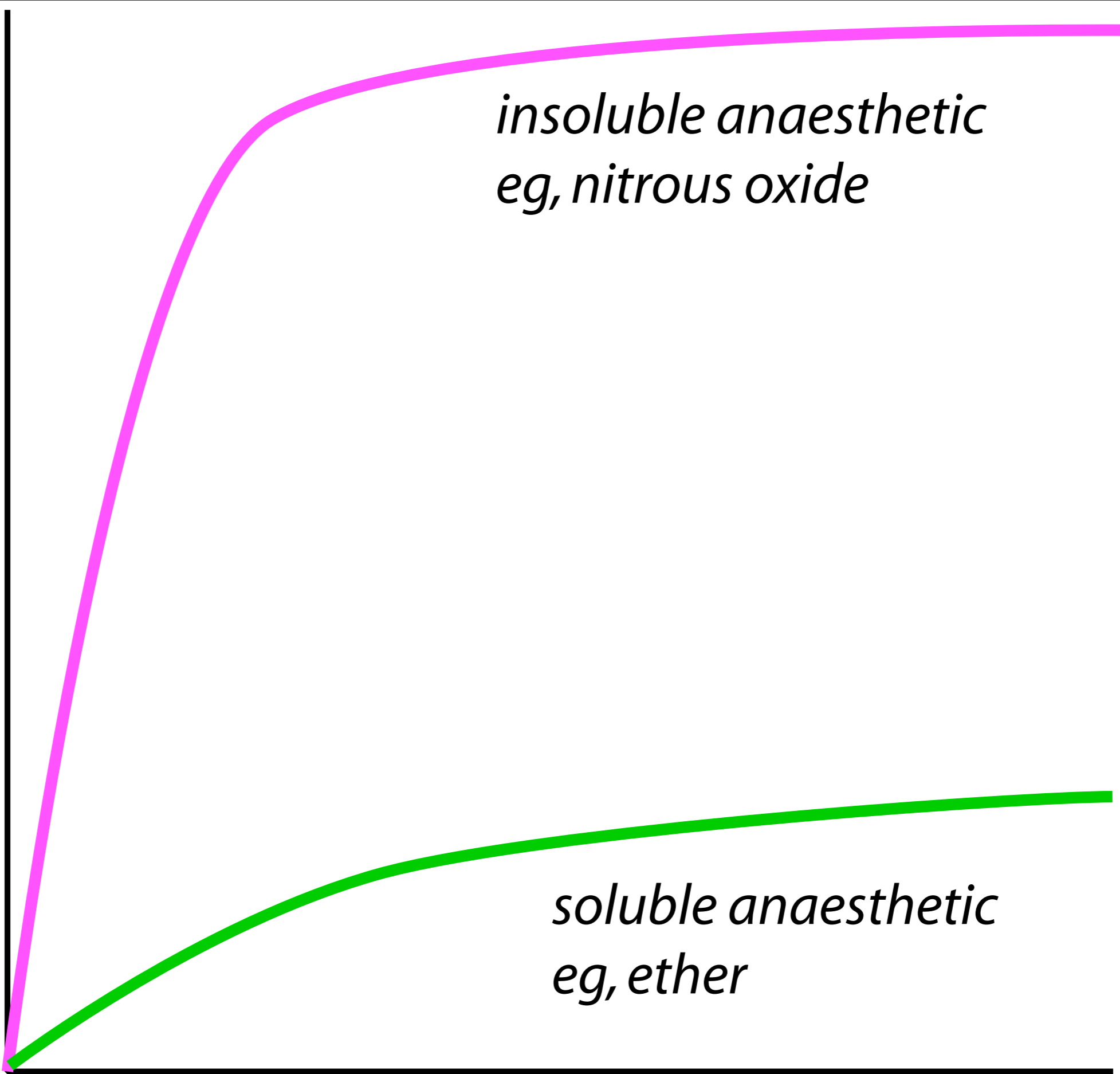
- **physical factors**
 - saturated vapour pressure
 - rubber solubility
 - blood gas coefficient
 - blood brain coefficient



uptake & elimination

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

alveolar conc / inspired conc



*insoluble anaesthetic
eg, nitrous oxide*

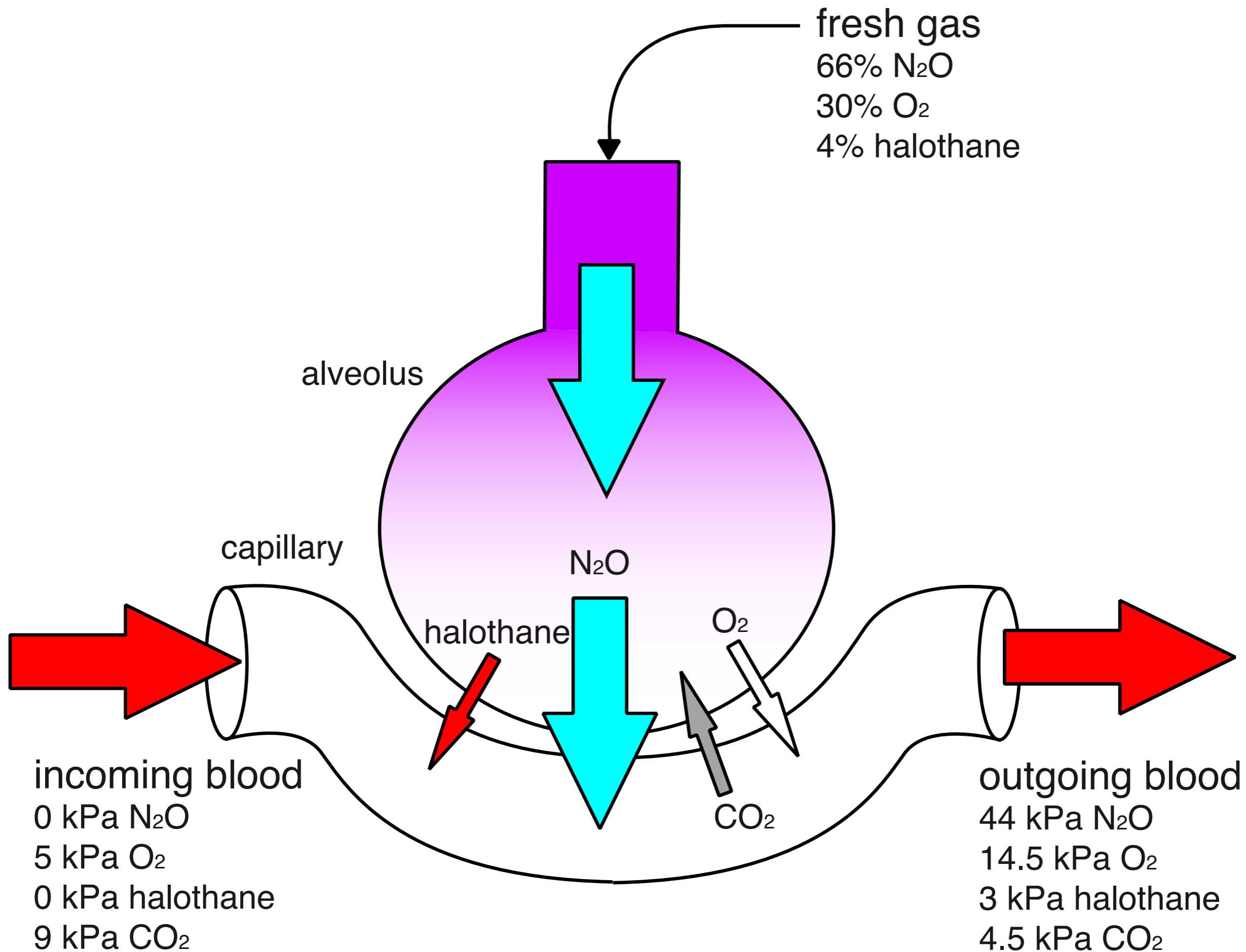
*soluble anaesthetic
eg, ether*

time

uptake & elimination

A large, red, spotted mushroom with a thick stem, growing in a field of dry grass. The mushroom has a bright red cap with numerous white spots. The stem is thick and appears to be covered in a fine, white, fuzzy texture. The background is a dense field of dry, brown grass.

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



distribution

A large, red, gilled mushroom with white spots on its cap, growing on a bed of dry pine needles. The mushroom is the central focus of the image, with its cap showing a gradient from red to orange. The background is a dense layer of dry, brown pine needles.

- **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**

A large, red, spotted mushroom with a white stem, growing in a field of dry grass. The mushroom has a bright red cap with numerous white spots. The stem is thick and white. The background is a dense field of dry, brown grass.

drugs

- **gases**
- **halogenated hydrocarbons**
- **ethers**

A photograph of a red mushroom with white spots, likely a fly agaric, growing on a bed of pine needles. The mushroom is the central focus, with its cap showing a gradient from red to orange and yellow. The background is a dense layer of dry, brown pine needles.

gases

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

oxides of nitrogen

- **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 large, bright red mushroom with white spots, growing on a bed of dry pine needles. The mushroom is the central focus of the image, with its cap showing a vibrant red color and several white, irregular spots. The background is a dense layer of dry, brown pine needles, creating a textured and natural setting for the mushroom.

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



gases

- **nitrous oxide**
- **xenon**
 - good anaesthetic but too expensive to use
- **cyclopropane**
 - explosive
 - **avoid!!!**



hydrocarbons

- **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

A large, bright red mushroom with white spots, growing on a bed of dry pine needles. The mushroom is the central focus of the image, with its cap showing a vibrant red color and several white, irregular spots. The stem is thick and appears to be covered in a white, fuzzy substance. The background is a dense layer of dry, brown pine needles, creating a textured and natural setting for the mushroom.

- 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

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



hydrocarbons

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



ethers

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

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%**

ether

- **mac = 3%**
- **BG = 12**
- **svp = 59 kPa**
- **induction - as much as possible**
- **maintenance - 3 - 10%**
- **inflammable in air, explosive in oxygen**



ethers

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



monitoring

- **end tidal vapour concentration**
- **cardiovascular depression**
 - **blood pressure**
- **respiratory depression**
 - **ET CO₂**

interactions

A large, bright red mushroom with white spots, growing on a bed of dry pine needles. The mushroom is the central focus of the image, with its vibrant red color contrasting sharply with the dry, brownish needles. The text is overlaid on the image, with the title 'interactions' in yellow and the list items in yellow, magenta, and white.

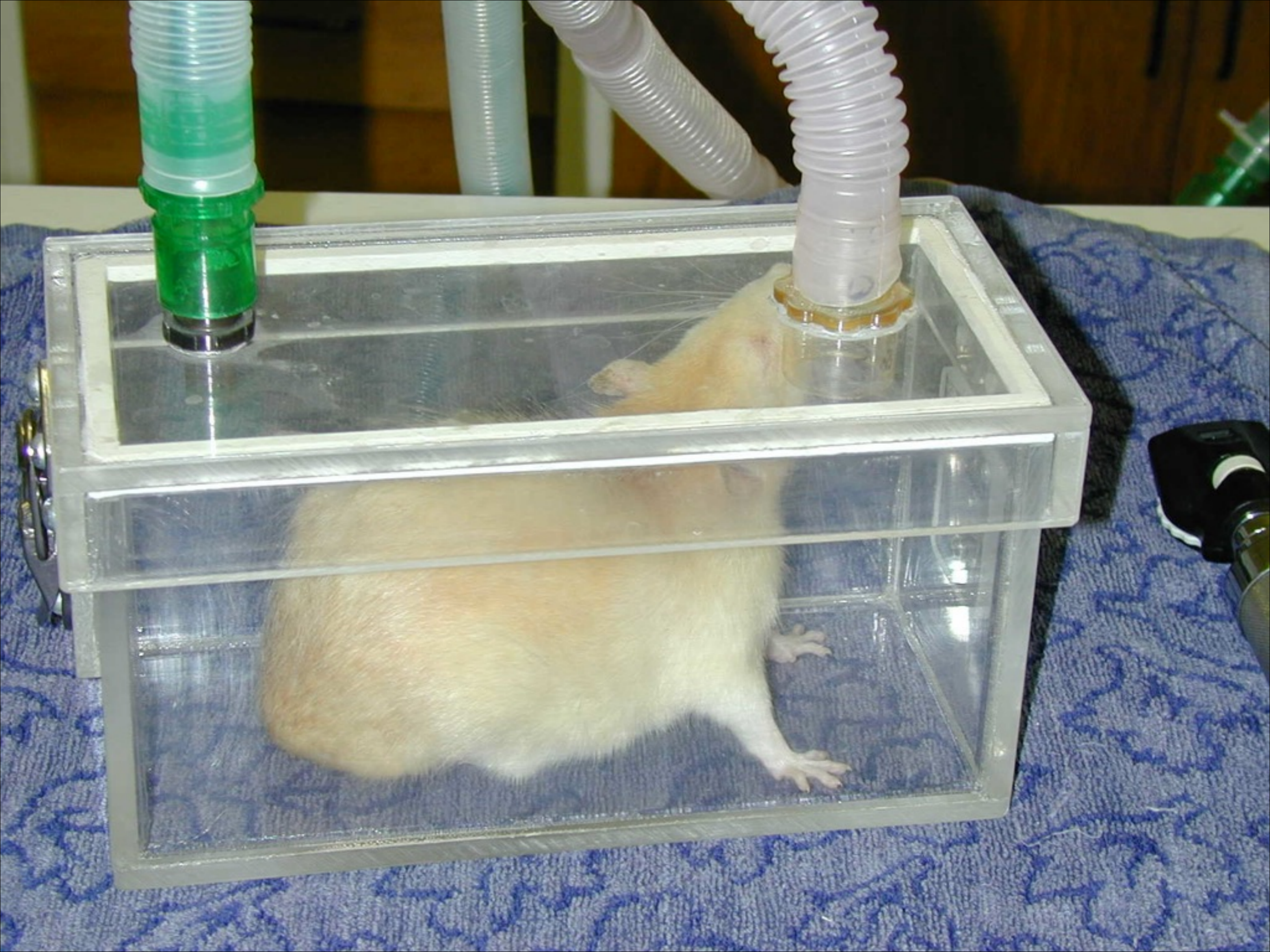
- **soda lime**
 - **trichloroethylene - phosgene**
 - **isoflurane**
 - **sevoflurane**

inhalation induction

- **relatively slow**
 - **but depends on drug**
- **long excitement phase**
- **lots of gas used**
- **potential for leaks**

inhalation induction

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

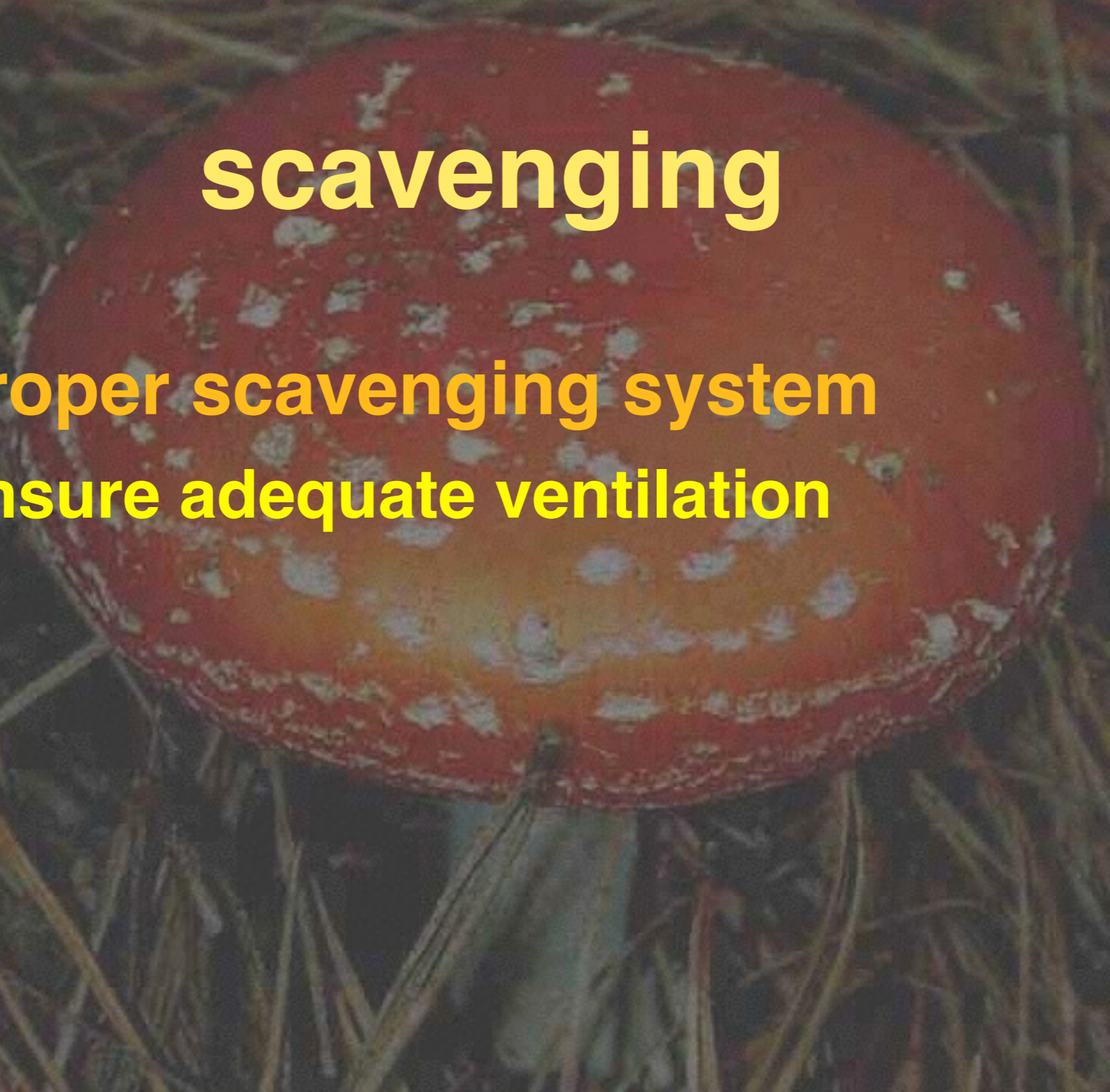






scavenging

- **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**

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 & isoflurane produce dose dependent respiratory and cardiovascular depression but not much analgesia**
- **drugs are eliminated by respiration - in overdose, ventilate with 100% oxygen**