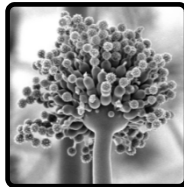


MOLD HAZARDS

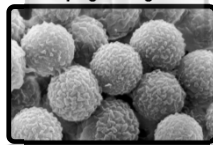
Mold

Molds are fungi
Reproduce by
making spores
Spores act like
seeds

Grow in warm,
damp, humid
conditions



Aspergillus Niger

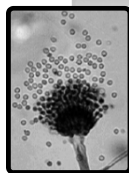


Aspergillus spores

Routes of Entry

Mold spores:

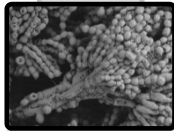
- Most 2 – 20 microns
- 250,000 spores can fit onto the head of a pin
- In 1 minute the lungs can breath in over 700,000 spores



Routes of Entry

Inhalation of particles:

- $> 10\ \mu\text{m}$ deposit in nose/upper airways
- $5 - 10\ \mu\text{m}$ deposit in the trachea and bronchi
- $< 5\ \mu\text{m}$ reach the alveoli
- Ave. Mold spore = $3\ \mu\text{m}$



Mold spores

Mold

Mold spores are everywhere

Mold becomes a problem in amplified environments

- **Grow op mold amplification**
occurs when indoor spore counts become significantly different from outdoor spore counts.

Mold

Mold mats

Require carbon materials to grow

Sources of building materials containing carbon:

- Sheetrock
- Tile grout
- Paper/cardboard
- Wood
- Ceiling tiles



Mold

Indoor grow operations:

Typical conditions in an indoor grow:

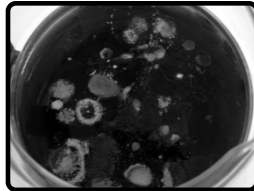
- Humidity 60 – 70%
- Temperature 68 – 72 °F
- Exposed building materials

These conditions are prime for mold!

Mold

**Over 400,000 types
of mold**

**50 – 100 indoor
molds with health
hazards**



Mold

**Certain molds (toxigenic species)
produce toxic chemicals.**

**Toxic chemicals produced by molds are
called mycotoxins.**

- mycotoxins are “self-defense”
mechanisms used by molds to fend off
competition.

Mold

3 main toxigenic species associated with indoor marijuana grows:

- **Stachybotrys**
- **Aspergillus**
- **Penicillium**



Toxic Mold

Stachybotrys

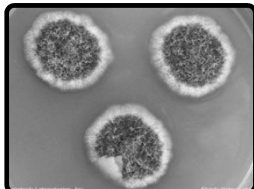
- **"Black Mold"**
- **Dark grey or black**
- **Grow in circular patterns**
- **Can look slimy, sooty, or like grayish white strands**



Toxic Mold

Stachybotrys

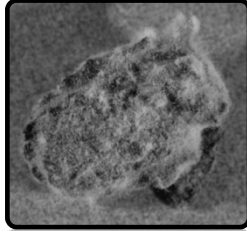
- **Mycotoxin from spores are known to produce:**
 - Known potent carcinogens
 - headaches
 - sore throats
 - flu symptoms
 - Diarrhea
 - Fatigue
 - Dermatitis
 - general malaise
 - psychological depression



Toxic Mold

Aspergillus

- Over 100 species of Aspergillus
- 16 species toxic to humans
- Develops in 1 - 2 days
- Known to grow on cannabis



Toxic Mold

Aspergillus

- Thermophilic – grows at body temperature or higher
- Xerophilic – takes moisture from humid (>%60) environments
- Can also be found in soil, paint, vents, sheet rock, wood...



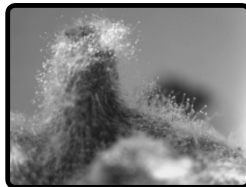
Toxic Mold

Aspergillus

Can produce a wide variety of diseases (aspergillosis)

Three clinical types of pulmonary aspergillosis:

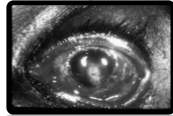
- Allergic
- Aggressive tissue invasion
- Fungus ball



Toxic Mold

Clinical aspergillosis Aggressive tissue invasion

- The aspergilli can invade any organ including skin



8 days after trauma

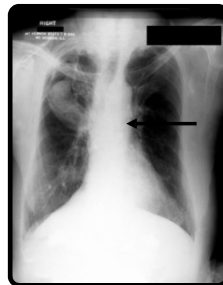


Tissue invasion

Toxic Mold

Clinical aspergillosis Fungal ball

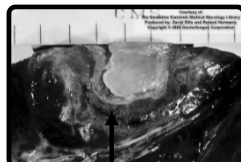
- Usually seen on old cavities of TB patients
- Mold will actually colonize in the cavity
- Patient may cough up pieces of the fungus



Toxic Mold

Clinical aspergillosis Fungal ball

- Also known to grow in lungs of patients with prior disease or suppressed immune systems



Fungal ball in lung of a child

Toxic Mold

Penicillium

- Develops in 1 – 2 days
- Most abundant mold in soil
- Over 150 species
- Older mats (> 2 weeks) appears blue in color
- Grows in environments > 60% humidity
- Can thrive in cold environments (34 °F)



SEM - penicillium

Toxic Mold

Penicillium

Various species produce mycotoxins:

- *Ochratoxin A* - nephrotoxic, hepatotoxic, carcinogenic
- *Penicillin* - antibiotic
- *Renitren A* and *roquefortine C* - tremorgenic
- *Patulin* - nephrotoxic and carcinogenic
- *Citrinin* - carcinogenic
- *Griseofulvin* - tumorigenic, teratogenic



Penicillium

Toxic Mold

Who are people at risk?

- Infants and children
- Elderly people
- Pregnant women
- Individuals with respiratory conditions or allergies and asthma
- Persons with weakened immune systems (for example, people with HIV infection, chemotherapy patients, or organ or bone marrow transplant recipients, autoimmune diseases.)

Symptoms of Mold Exposure

Various molds cause various symptoms
 Individual immune responses will vary
 Length of time for symptoms will vary
 Fungal infections often misdiagnosed
 For any symptoms seek medical attention

- Inform physician of work history (potential mold exposure).

Medical Treatment

Medical treatment for exposures may include:

- Surgical care
- Treatment with an antifungal agent
 - Amphotericin B (Abelcet, AmBisome, Amphotec)
 - Itraconazole (Sporanox)
 - Caspofungin (Cancidas)
 - Voriconazole (VFEND)
 - Posaconazole (Noxafil)
 - Corticosteroids
 - Prednisone (Deltasone, Meticorten, Orasone)

Questions?
