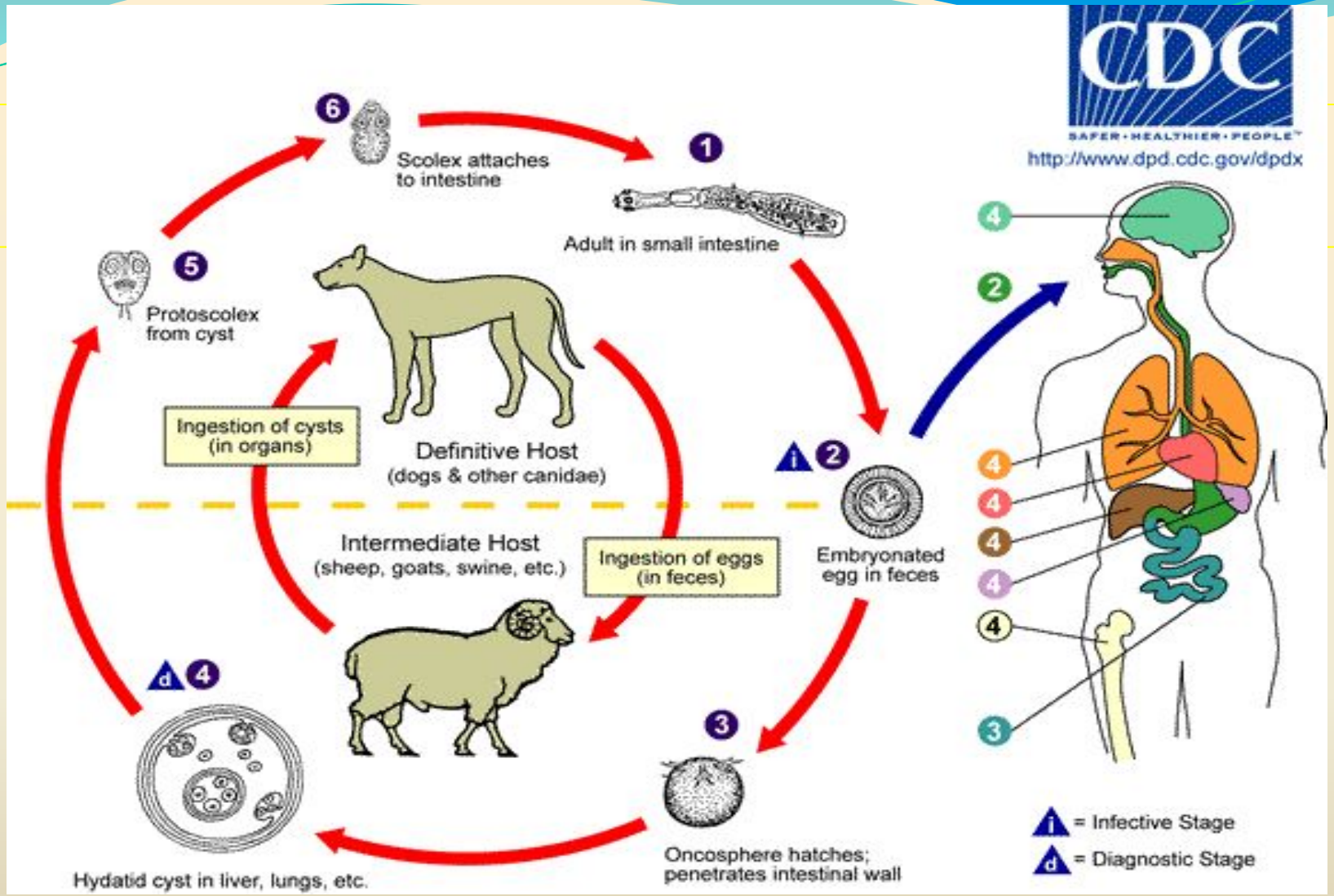
ECHINOCOCCUS GRANULOSUS

Echinococcus granulosus, also called the **Hydatid worm** or **Hyper Tape-worm** or **Dog Tapeworm**, is a cyclophyllid cestode that parasitizes the small intestine of canids as an adult, but which has important intermediate hosts such as livestock and humans, where it causes hydatid disease

Morphology

This is the smallest of all tapeworms (3 to 9 mm long) with only 3 proglottids. The adult tapeworm ranges 7 mm in length and 3mm in width, the body consist of three proglottids - an immature proglottid, mature proglottid and a gravid proglottid. Like all cyclophyllideans, *E. granulosus* has four suckers on its scolex ("head"), and *E. granulosus* also has a rostellum with hooks.


B


CDC
SAFER·HEALTHIER·PEOPLE™
http://www.dpd.cdc.gov/dpdx
6
Scolex attaches to intestine
1
Adult in small intestine
5
Protoscolex from cyst
Ingestion of cysts (in organs)
Definitive Host
(dogs & other canidae)
i 2
Embryonated egg in feces
Intermediate Host
(sheep, goats, swine, etc.)
Ingestion of eggs (in feces)
d 4
Hydatid cyst in liver, lungs, etc.
3
Oncosphere hatches; penetrates intestinal wall
4
2
4
4
4
4
4
3
i = Infective Stage
d = Diagnostic Stage

Lifecycle

1-The adult worm lives in the small intestine of domestic and wild .carnivorous animals (dog, wolf)

Eggs, passed by infected animals -2

Farm animals or man are ingested the egg -3

The egg hatch into oncospher and penetrate the wall of small -4 intestine and localize in different organs and develop into hydatid cysts containing many larvae (proto-scolices or hydatid sand)

When other animals consume infected organs of these animals, -5 proto-scolices escape the cyst, enter the small intestine and develop . into adult worms

- *Echinococcus* eggs, when swallowed by man, produce embryos that penetrate the small intestine, enter the circulation and form cysts in liver, lung, bones, and sometimes, brain. The cyst is round and measures 1 to 7 cm in diameter, although it may grow to be 30 cm.
- The cyst consists of an outer a nuclear hyaline cuticle and an inner nucleated germinal layer containing clear yellow fluid. Daughter cysts attach to the germinal layer, although some cysts, known as brood cysts, may have only larvae (hydatid sand). Man is a dead end host.

Symptoms

The symptoms, comparable to those of a slowly growing tumor, depend upon the location of the cyst.

1- Large abdominal cysts produce increasing discomfort.

2- Liver cysts cause obstructive jaundice.

3- Peribronchial cysts may produce pulmonary abscesses.

4-Brain cysts produce intracranial pressure and Jacksonian epilepsy.

5- Kidney cysts cause renal dysfunction. The contents of a cyst may produce anaphylactic responses.

- Leakage of fluid from the cyst (hyatid sand) causes eosinophilia.
- Rupture of a hydatid cysts as a consequence of trauma or surgery is very dangerous because it can cause anaphylactic shock, possible allergic reaction, and risk spreading hydatid sand which can give rise to new cysts throughout the body.

Diagnosis

1-Clinical symptoms of a slow-growing tumor accompanied by eosinophilia are suggestive.

2-Intradermal (Casoni) test with hydatid fluid is useful.

3- Pulmonary cysts and calcified cysts can be visualized using x-rays.

4- Antibodies against hydatid fluid antigens have been detected in a sizable population of infected individuals by ELISA or indirect hemagglutination test.

Treatment and control

Treatment involves surgical removal of cyst-1

inactivation of hydatid sand by injecting the cyst with-2 .10% formalin and its removal within few (4-5) minutes

Prazequantel has been shown to be effective in many-3 .cases

.Albendazole, in high doses, is an alternative -4

Preventive measures involve avoiding contact with infected dogs to elimination of their infection

E. MULTILOCULARIS

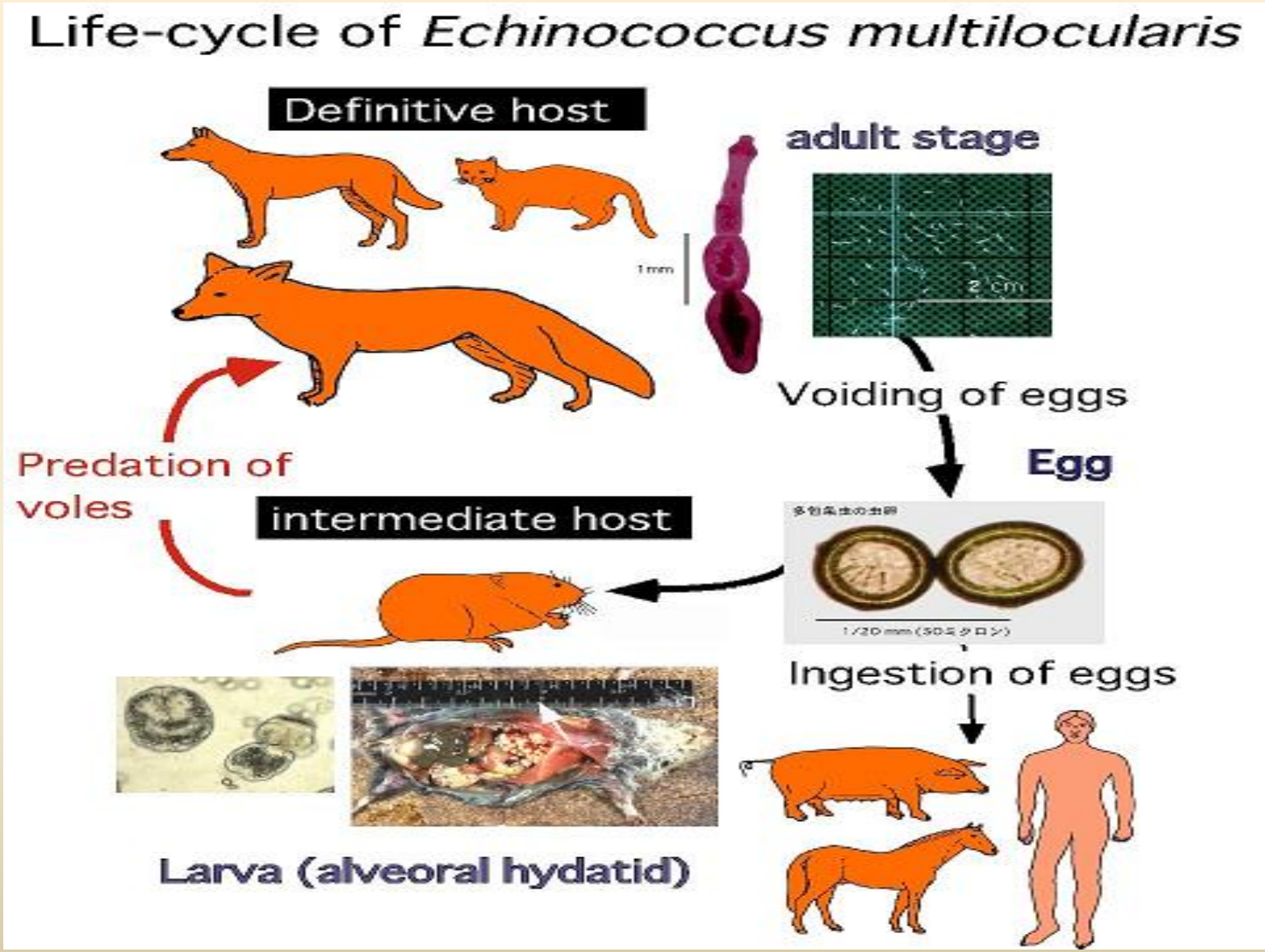
-This is a tapeworm, similar to *E. granulosus*, that also causes hydatid in northern parts of Asia and North America.

- It has a very similar morphology and life cycle except that rodents are its intermediate host.

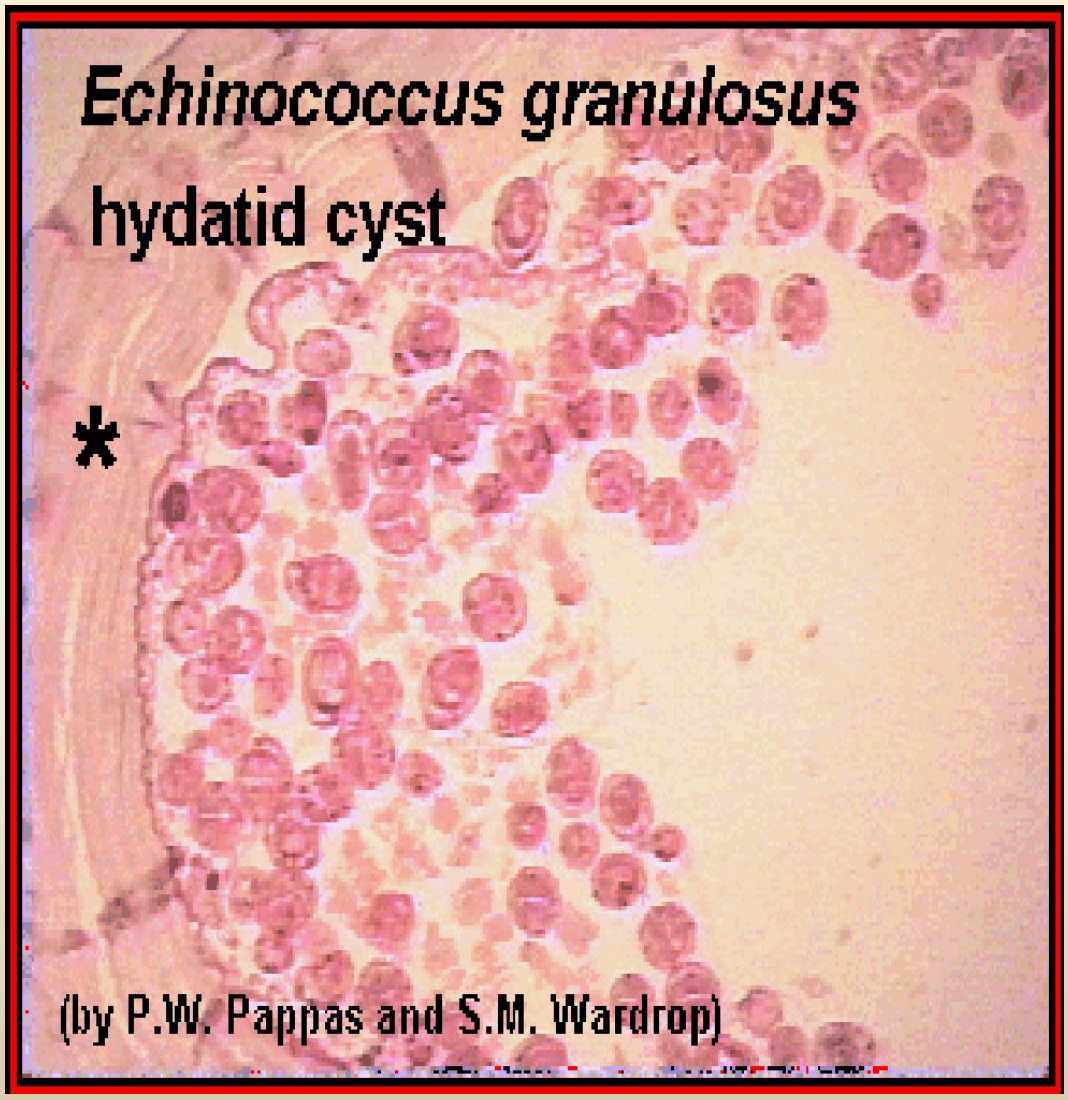
- Humans, when infected with this worm, also develop hydatid cysts which produce symptoms similar to those caused by *E. granulosus*. However, the cysts are multilocular (many chambers).

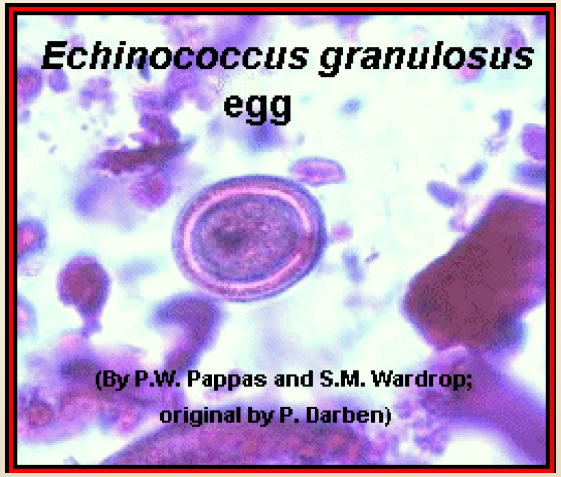
- The organism is resistant to praziquantel; high doses of Albendazole has some anti-parasitic effect. Surgery is the means of removing the cyst. Rodent control is the means of prevention.

Life-cycle of *Echinococcus multilocularis*



Cerebral hydatidosis


Echinococcus granulosus
hydatid cyst
*
(by P.W. Pappas and S.M. Wardrop)


Echinococcus granulosus
egg
(By P.W. Pappas and S.M. Wardrop;
original by P. Darben)