

Echinococcus granulosus
infection in stray dogs in south
east Wales

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Echinococcus granulosus

- ▶ The worm that causes 'hydatid disease', also known as 'cystic echinococcosis' & 'cystic hydatidosis'
- ▶ Is a 'true' tapeworm belonging to the Family 'taenia' - genus '*Echinococcus*'
- ▶ 4 further taxonomically valid species of '*Echinococcus*'

Other species of *Echinococcus*

1. *Echinococcus multilocularis*

Causing Alveolar hydatid disease

2/3. *Echinococcus oligarthrus* & *Echinococcus vogeli*

Causing polycystic hydatid disease

4. *Echinococcus shiquicus*

Recently found in the Tibetan plateau – zoonotic potential is currently unknown

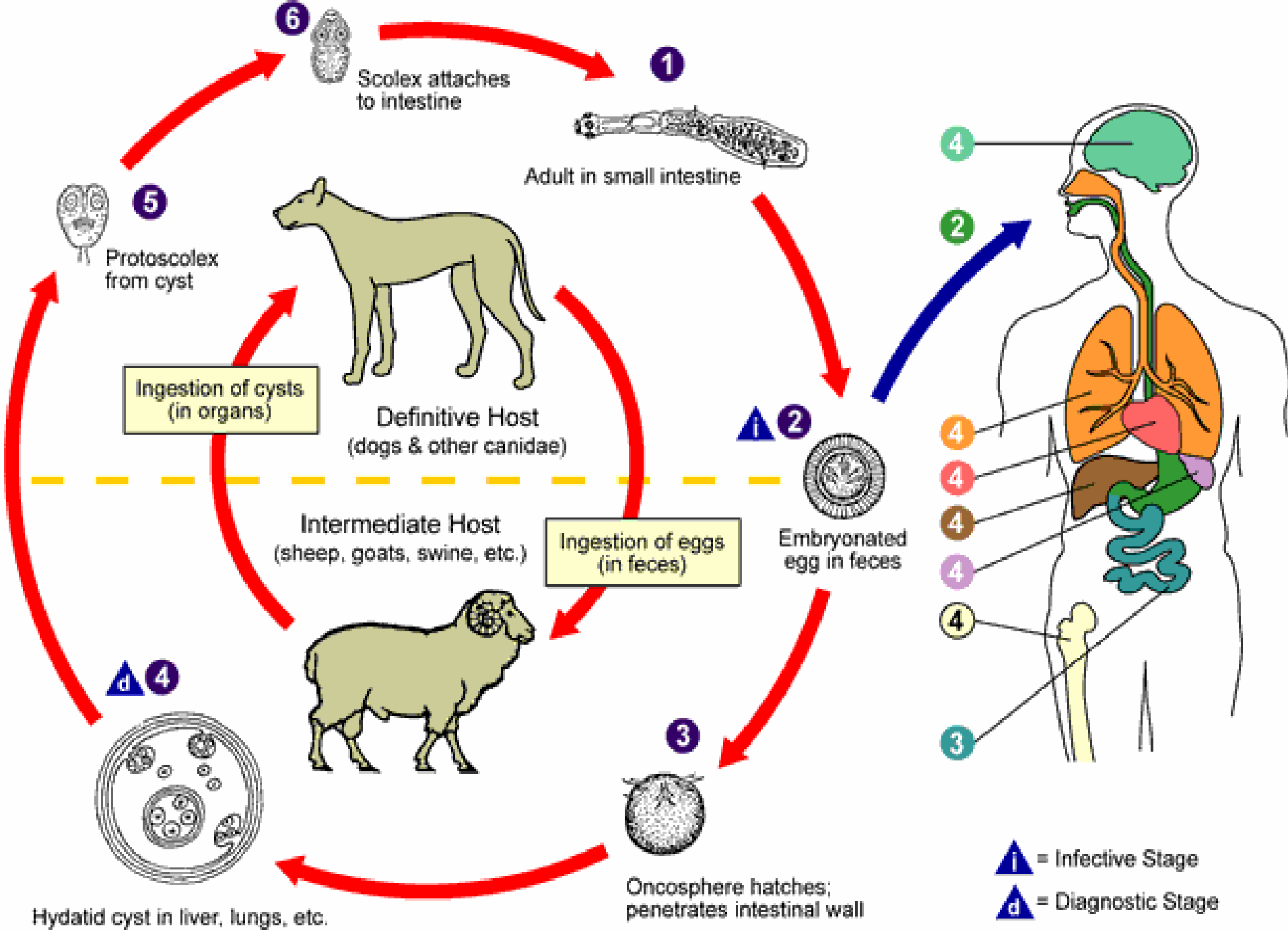
Echinococcus granulosus

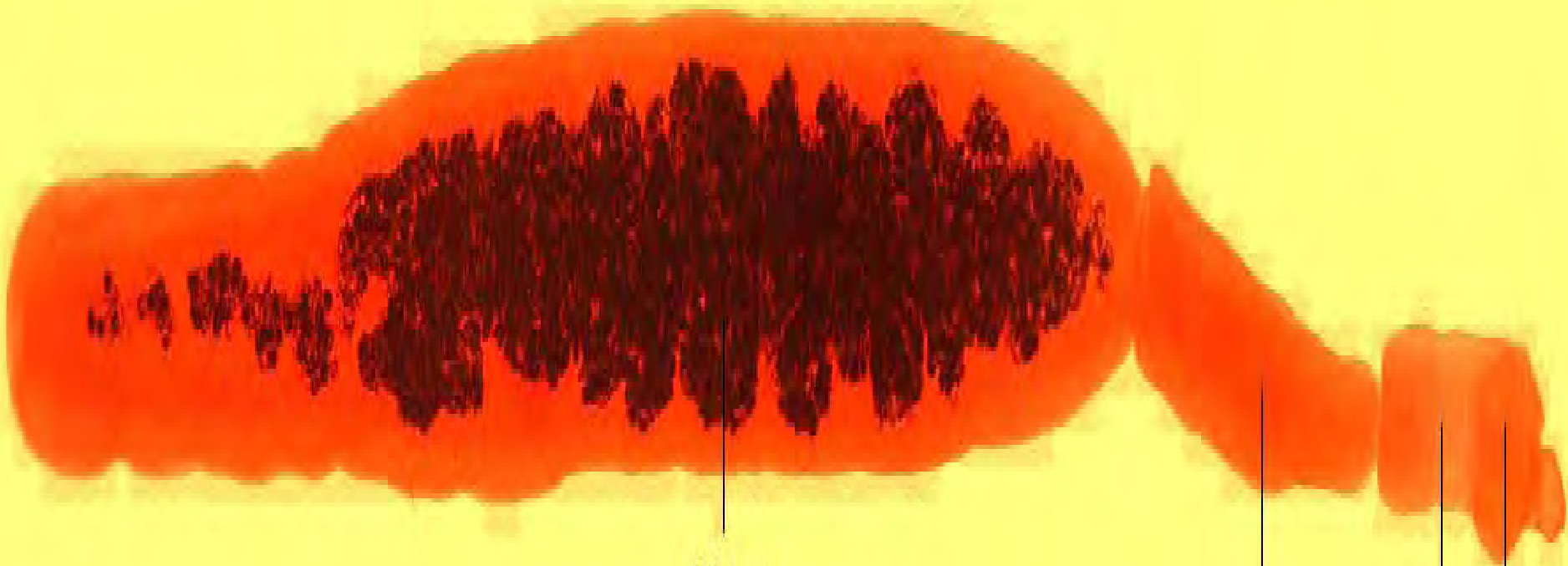
Sub species or genotypes

- ▶ 10 genotypes determined through mitochondrial DNA analysis
- ▶ Classified as G1 to G10
- ▶ All zoonotic except G3 (buffalo strain); G4 (horse strain) & G9 (lion strain)

Lifecycle

- ▶ **Each species requires:**
- ▶ a “definitive” or “final” host – canine family in all but 1 lifecycle – (the lion strain) - where the worm develops
- ▶ & an “intermediate” host – which is specific to the genotype – where the eggs develop





Uterus

Proglottide

Collum

Scolex



Lifecycle continued

- ▶ Canine host sheds the uterus section of the worm in faeces
- ▶ Intermediate host consumes eggs (often whilst grazing)
- ▶ Eggs develop in intermediate host
- ▶ Canine becomes re-infected by consuming infected intermediate host
- ▶ Humans become infected through canine faeces, ie, allowing dogs to lick the face

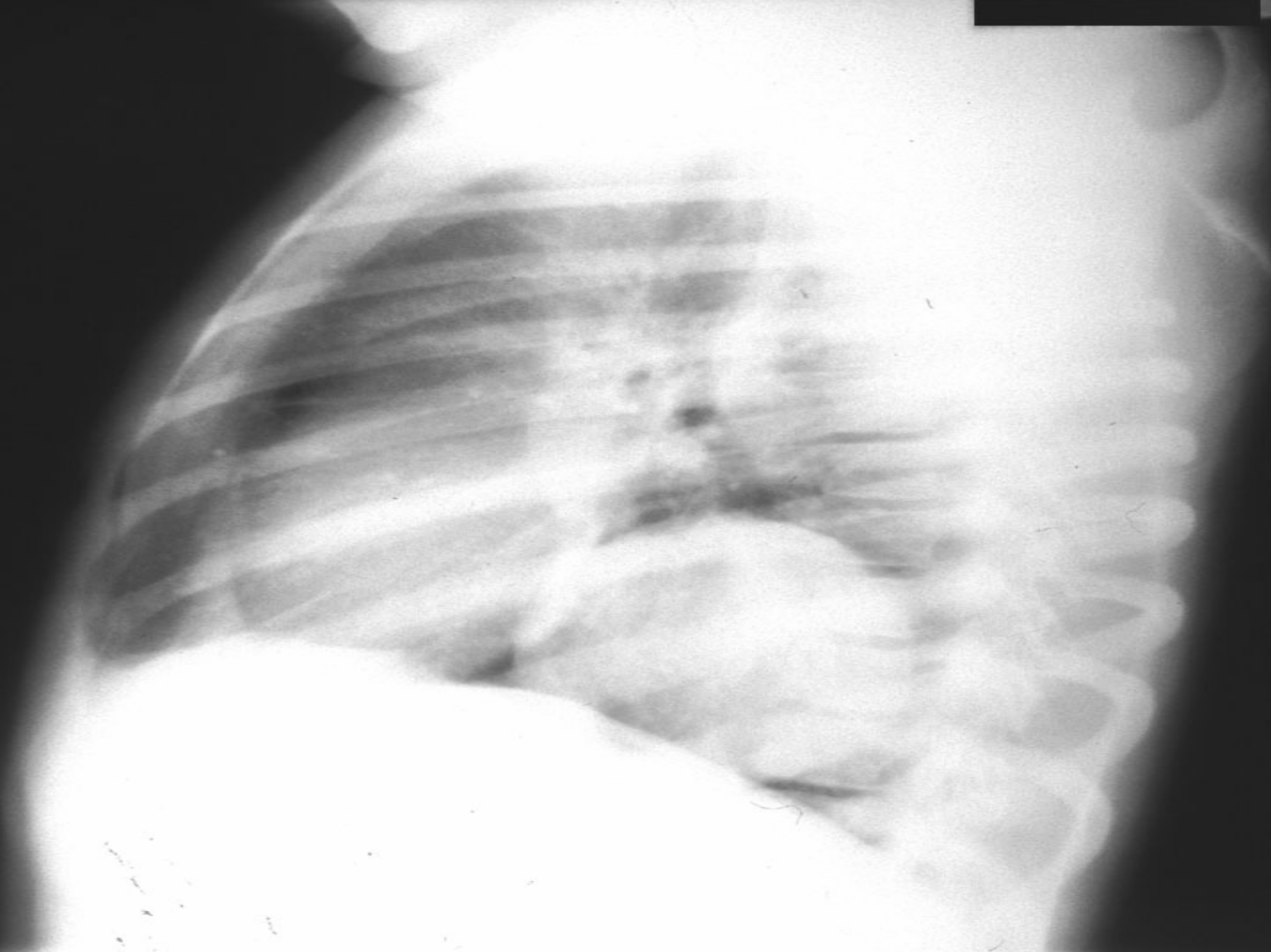
WHEN THE DOG...

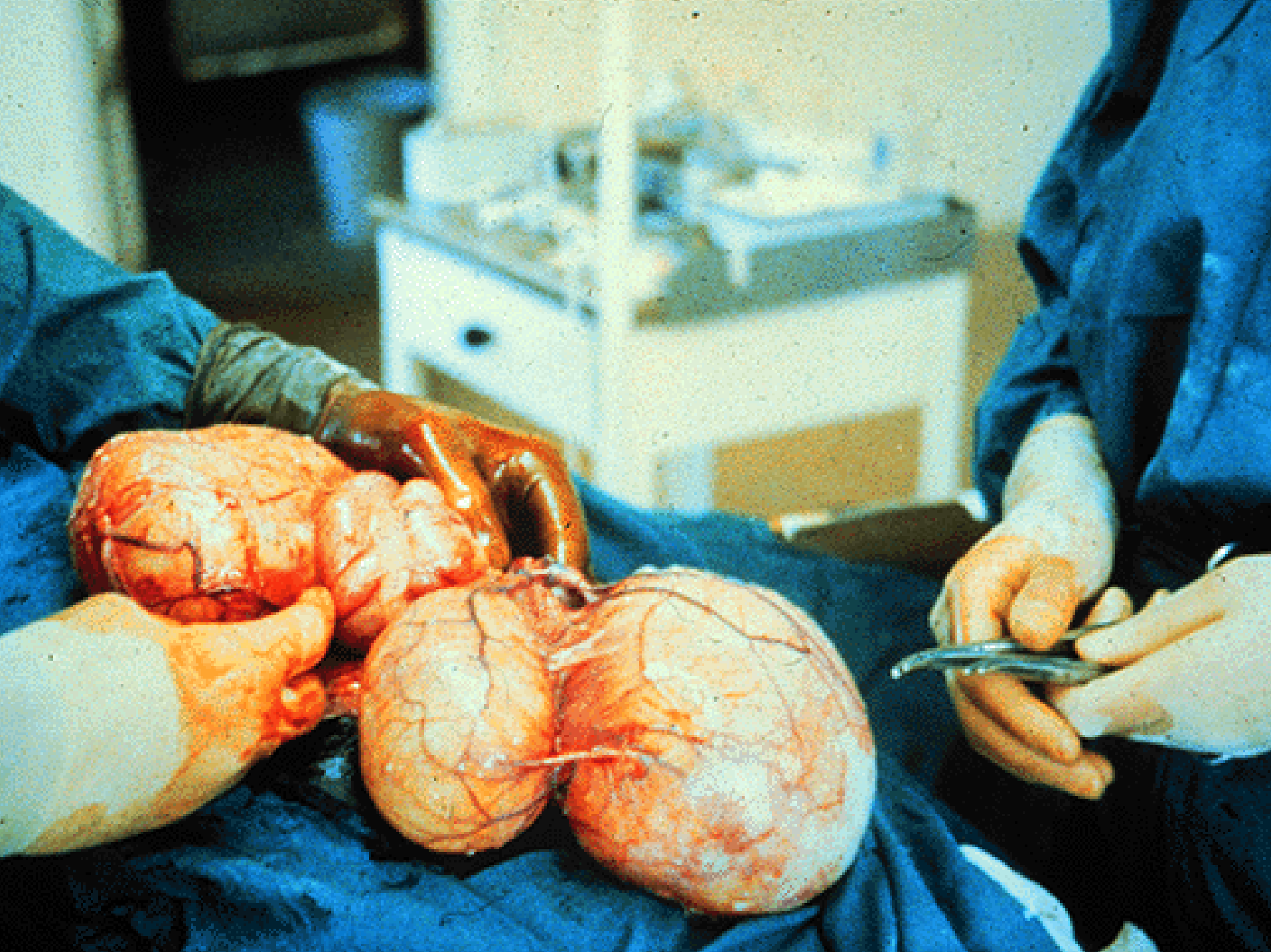


IS NOT MANS BEST FRIEND









G1 Genotype

- ▶ G1 or “sheep” strain most widespread
- ▶ Involves dogs (definitive) host and sheep (intermediate) host
- ▶ It is the G1 strain that is endemic in south Wales principally south Powys due to intensive sheep farming
- ▶ G4 horse strain also endemic in UK & Ireland – however does not appear to be zoonotic & thus pose risk to man

How can hydatid disease be controlled in the UK ?

- ▶ **Need to break the lifecycle**
- ▶ Deny dogs access to infected sheep carcasses
- ▶ Regular treatment of dogs with anti parasitic treatment containing Praziquantel e.g., Droncit, Droncit +

South Powys Hydatid control programme 1983-1989

- ▶ Involved regular supervised worming of farm dogs
- ▶ Educational activities
- ▶ Withdrawn in 1989 due to lack of funding
- ▶ Recent research confirms hydatid disease has re emerged in south Powys & bordering areas – north Gwent & Mid Glamorgan

**A new control programme must
be introduced in south Powys &
those bordering areas to
control *E. granulosus* infection**

Pre requisites before the introduction of a control programme

- ▶ Infection levels in all known hosts:
 - ▶ Ovine
 - ▶ Human
 - ▶ Canine

What do we know about infection levels in dogs ?

- ▶ Farm dogs are infected
- ▶ Pet dogs – no data
- ▶ Stray dogs – very little data apart from 1 small scale survey in 1996 (approx 40 dogs)
- ▶ Hunting dogs & farm dogs – no data

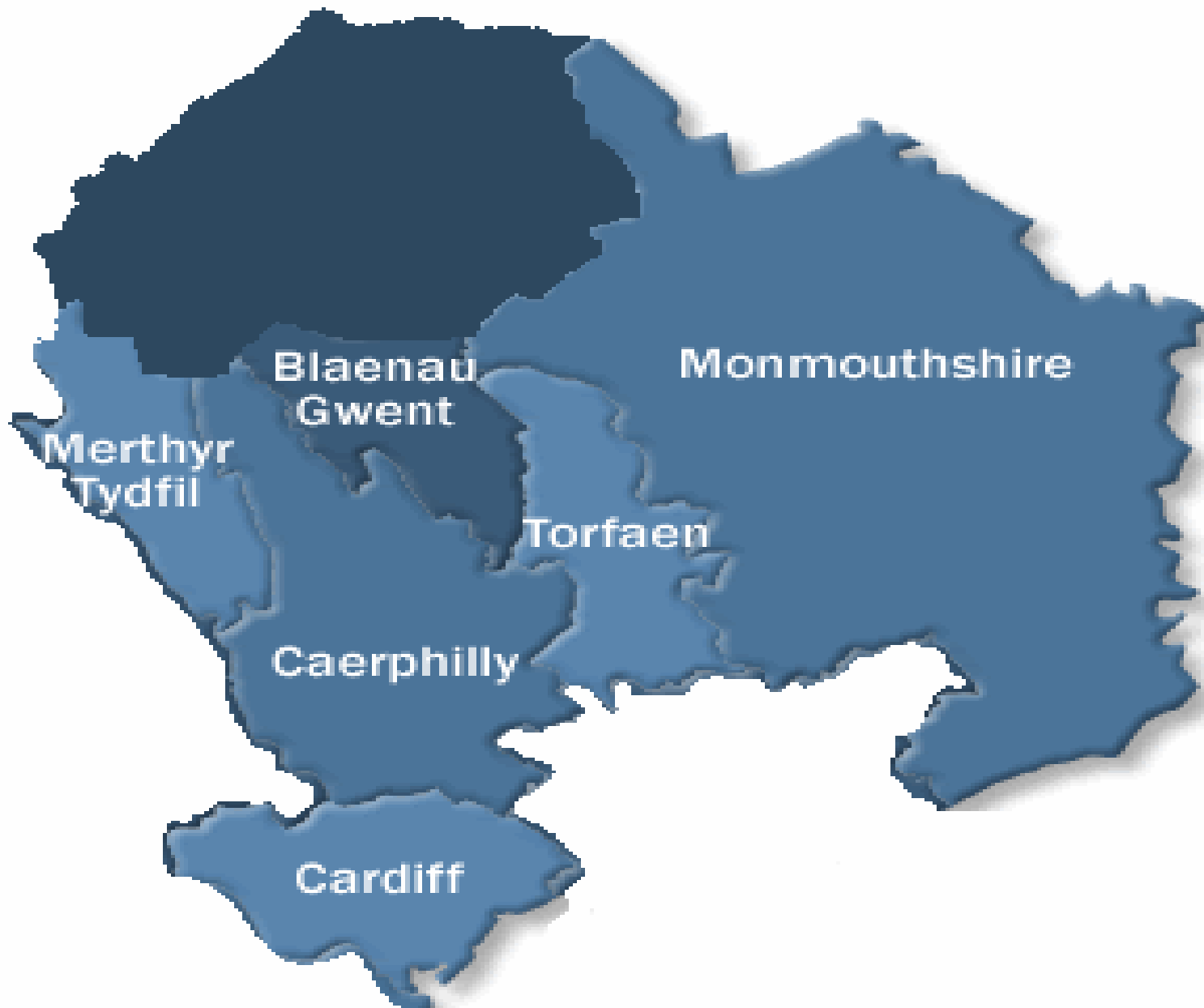
Purpose of Study

- ▶ To determine infection levels in stray dogs
- ▶ These dogs are considered 'worst case scenario' because:
 - ▶ *Unlikely* to be regularly wormed
 - ▶ Access to infected carcasses in rural areas
 - ▶ Unattended access to public areas
 - ▶ Faeces are not removed

Sampling area

From 2 May 2007 – 31 December 2007

- ▶ South Powys
- ▶ Merthyr Tydfil
- ▶ Monmouthshire
- ▶ Caerphilly
- ▶ Blaenau Gwent
- ▶ Torfaen
- ▶ Cardiff



Sampling procedure

- ▶ Stray dogs collected by local authority
- ▶ Co operation of kennelling facility
- ▶ Provided with sample pot, disposable gloves, antibacterial hand wash, data sheet, freezer
- ▶ Sample collected from kennel floor, placed in pot, labelled & frozen

Sampling procedure – cont.

- ▶ Samples collected from kennels each month
- ▶ Delivered to Salford University “ Cestode Zoonoses Research Group”, Manchester.
- ▶ Samples subjected to coproantigen ELISA technique
- ▶ Possible positive samples subjected to PCR analysis

Results

- ▶ 857 samples collected & analysed – largest study of stray dogs to date in UK
- ▶ Of this, 14 'possible positive' samples subjected to PCR analysis
- ▶ PCR determined no positives
- ▶ All 857 dogs tested were negative

Discussion

- ▶ Stray dogs not considered to play a role in the transmission of hydatid disease in S.E. Wales although further sampling necessary in south Powys due to small sample size
- ▶ Determination of levels of infection in hunting dogs / fox hounds necessary
- ▶ Emphasis to be placed on treatment of farm dogs