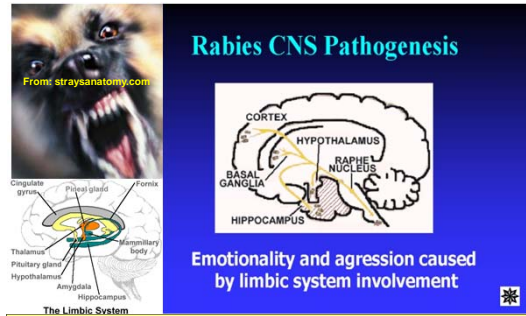


狂犬病防疫全球概況

台灣大學獸醫專業學院
費昌勇教授

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攻擊性行為是因為病毒感染後造成：(1)腦神經功能不全(neuronal dysfunction)、(2)低血清素行動(low CNS serotonergic activity)，與(3)高鞏固劑症所致。血清素管理生命現象諸如：睡眠、甦醒、記憶、痛覺等，屬於limbic system。

4

內容綱要

- 病原性、免疫性、新治療法
- 已開發與開發中國家疫情特徵
- 世界衛生組織推薦之防疫措施
- 美國犬貓狂犬病社會狀況
- 中國狂犬病概況

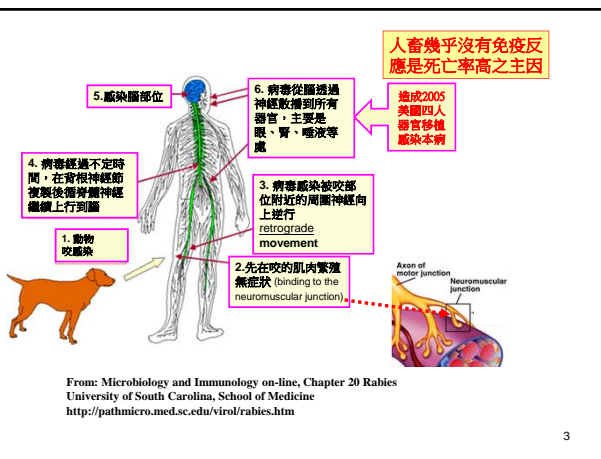
2

Lyssavirus 之分類

基因型	特徵	發生地區
I	Rabies virus (RABV)	全世界肉食獸、蝙蝠(美國)
II	Lagos bat virus (LBV)	非洲蝙蝠
III	Mokola virus (MOKV)	非洲鼠類
IV	Duvenhage virus (DUVV)	非洲蝙蝠
V	European bat lyssavirus type I (EBLV-1)	歐洲蝙蝠I型
VI	European bat lyssavirus type II (EBLV-2)	歐洲蝙蝠II型
VII	Australian bat lyssavirus (ABLV)	澳洲蝙蝠

From: www.who.int

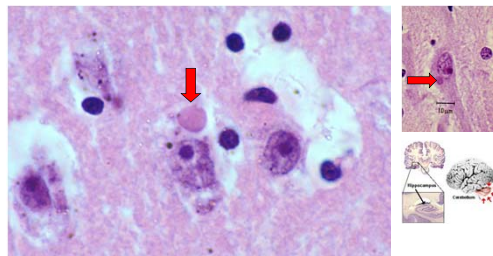
5



From: Microbiology and Immunology on-line, Chapter 20 Rabies
University of South Carolina, School of Medicine
<http://pathmicro.med.sc.edu/viro/rabies.htm>

3

Negri body



Negri bodies, round eosinophilic cytoplasmic inclusions measuring 1-7 μm , are pathognomonic of rabies (HE, high power). Hippocampal neurons are the preferential site of Negri body formation. From: US_CDC

6

狗狂暴型(25%)麻痺型(75%)

- **Furious rabies** (狂暴型) causes the animal to foam (口吐白沫) and drool (從嘴滴下) at the mouth. Animals behave unpredictably and may become vicious, snap (猛咬) at imaginary objects and attack without warning. The animal becomes progressively unco-ordinated, paralysed and usually dies in 4-5 days.
- **Dumb rabies** (麻痺型) causes early paralysis, followed by drooling and death. Animals with dumb rabies remain quiet and only bite when provoked. They are unable to eat, but will frequently try to drink water.
- From: <http://canisbonus.com> ; www.who.int.



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感染方式

- 咬
- 舔(動物吃動物)
- 吃反芻食物(母狼餵小狼)
- 吃奶(牛奶中排毒---巴斯德滅菌法可滅毒)
- 呼吸道吸入
- 胎盤感染
- 黏膜接觸

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A rabid dog, with saliva dropping out of the mouth. From Wikipedia

8

應接受預防注射之高風險族群

Pre-exposure, prophylactic immunisation

1. Laboratory staff 傳染病實驗室員工
2. Quarantine stations 檢疫人員
3. Animal handlers 動物照顧者
4. Veterinary surgeons 獸醫師
5. Field workers 野外工作者
6. Port officials 港口工作者
7. Licensed handlers 發動物相關證照者
8. Health workers 衛生醫療人員
9. Travellers 旅客

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美國研發成功狂犬病治療新法



世界第一例：美國Wisconsin州Fond du Lac郡的一位15歲女學生**Jeanna Giese** 2004年被蝙蝠咬後出現典型之狂犬病臨床症狀，經 Dr. Rodney Willoughby Jr. 研發之 **Milwaukee protocol** 治療後痊癒。原理是感染狂犬病後用ketamine, phenobarbital等藥物引導病人麻醉六天，以避開狂犬病病毒之致害反應。等病人的免疫系統啟動並殺死病毒後，再讓病人甦醒。結果陸續治癒多人。後**Jeanna Giese** 2011年 Spring從Lakeland College, Dept. Biology畢業。From: (1) Recovery of a Patient from Clinical Rabies --- Wisconsin, 2004, CDC Weekly December 24, 2004 / 53(50):1171-1173. (2) Wikipedia.

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狂犬病流行之風險

- 有病源之保毒者(蝙蝠/浣熊/臭鼬/狐/豺狗)。
- 狗群管理不好。
- 疫苗接種率低於70% (WHO---含流浪狗)。
- 民眾不了解(社會教育不夠)。
- 環境髒亂。

資料來源

1. WHO 2005 Technical Report Series 931, 2005 published. p. 31
2. Matter H C and Daniels T J 2000 Dog ecology and population biology, in dogs, zoonoses and public health. In Macpherson C N L, Meslin F X and Wandeler A I (eds) Dogs, Zoonoses and Public Health, chap. 2, pp. 17-62. CABI Publication, USA.

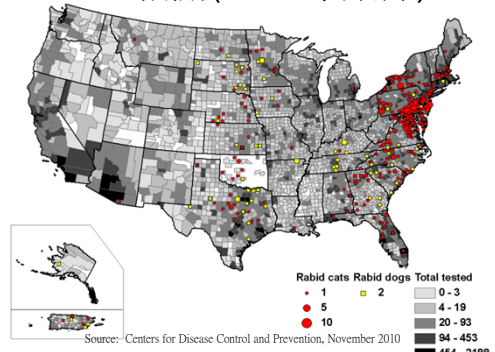
12

開發中國家之特徵(亞洲、非洲等) ：狗貓感染率高

- 家狗多，管理不好
- 疫苗接種率低
- 疫苗品質不好
- 民眾認知不足(社會教育不足)
- 流浪狗多四處傳播疾病

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美國狗貓狂犬病疫情與人口密度 呈正相關(2009年數據)

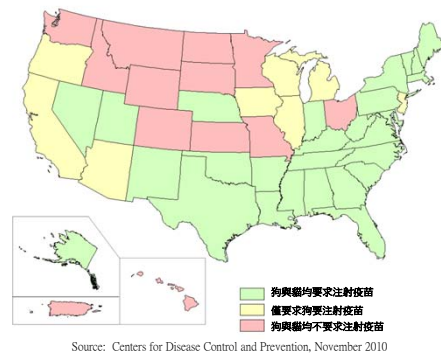


已開發國家之特徵(美國與西歐)： 狗貓感染率低

- 家狗家貓管理得很好，感染率低
- 流浪狗貓少，疾病不會散布
- 主要是蝙蝠等野生動物保毒與散布

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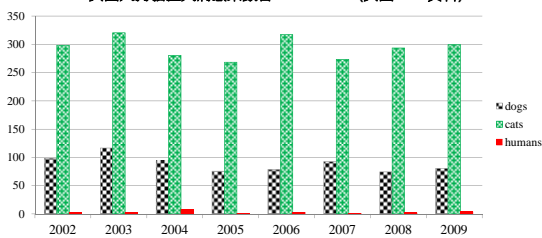
美國各州狗貓狂犬病法律不一致



美國人狗貓狂犬病疫情2002-2009

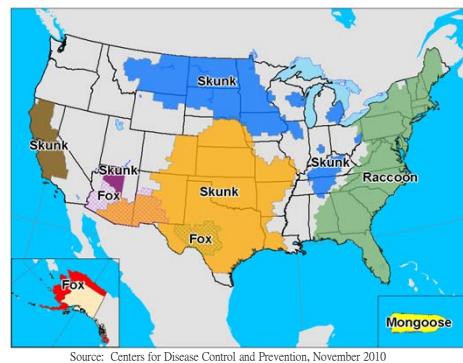
1. 狗：都市近郊之垃圾箱吸引帶原野生動物來吃垃圾時感染狗
2. 貓：貓因外出至家附近森林玩耍被帶原之野生動物感染

美國人狗貓狂犬病感染數目 2002-2009 (美國CDC資料)



15

美國野生保毒動物



TNR流浪貓聚落之狂犬病風險

By LIZ MUGAVERO Norwich Bulletin (Feb. 11, 2007)

GRISWOLD -- A **feral cat colony** is in danger of extermination after one of the kittens was discovered to be rabid. The colony is living behind a home on Voluntown Road and has a caregiver, according to Mark Wickerd, president of Forgotten Angels Animal Sanctuary. Wickerd was assisting in a trap-neuter-return program (**TNR**) with the cats in the colony when the kitten was discovered to have a bite wound and apparent neurological problems. He brought the kitten to a veterinarian, where it was euthanized and sent out for rabies testing.

<http://www.norwichbulletin.com/apps/pbcs.dll/article?AID=20070211/NEWS01/702110336>

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十九世紀歐洲都市狂犬病防疫通告 (標準都市型防疫措施)

11th, June 1829 Bologna, Italy 公告

昨天一隻無主兇狗進城，被咬的人均已送醫。茲規定如下：

1. 所有家狗禁止外出，且注意在家中不得咬訪客。
2. 家狗出門一律繫頸鍊，否則以無主狗論處。
3. 警察將撲殺所有室外無主狗，即使帶狗鍊亦要撲殺。
4. 所有狗咬人事件均需報告市公所公共衛生部門。
5. 凡家狗被其他狗咬，或出現疑似狂犬病症狀都要報告。
6. 註：當時沒有 [戴口罩] 之規定。

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收容所疑似狂犬病檢疫狗被偷

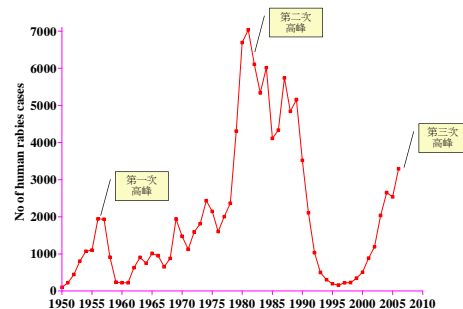
ABC News (Feb, 12, 2007)

Little River man who was bitten by a pit bull may have to get several shots unless the stolen dog is found. Bill Rosallino got bitten in the leg when he tried to break up a fight between a pit bull and his dog. Animal control officers picked up the pit bull, but it and another dog were stolen from the county's animal shelter Friday night. The Department of Health says they were holding the animal for 10 days to check it for rabies. Both dogs had been strays that were found in the Little River area.

<http://www.wpde.com/news/viewarticle.asp?view=3900A>

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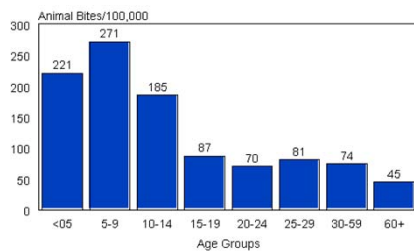
中國狂犬病近半世紀流行狀況



From: Zhang YZ et. al. (張永振等繪圖). Human rabies in China. Emerg. Infect Dis, 2005, 11: 1983-2002. 23

容易被狗咬的年齡

Age Specific Animal Bite Rates, 1998



From: <http://www.in.gov/isdlh/dataandstats/disease/2000/ldrab.htm> (Indiana State Dept. Health)

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中國之狂犬病疫情

- 中國狂犬病屬基因 I 型 (*Virus Research* 121 (2006) pp. 179-188)；狗咬發生率佔總感染率之96~98%，貓咬佔2~3%
- 狗肉師傳傷口接觸狂犬狗屠體之腦與唾液感染
- 早期感染尚未出現症狀之狂犬狗舔人類傷口感染
- 中國之國產疫苗是用減毒ERA株/SAD株，與市街毒之DNA高度同源 (WHO僅推薦SAG2與VRG減毒株作狂犬病疫苗)
- 未做狗數調查，寵物登記不清楚，未做狗族群研究
- 疫苗供應量不足，防疫不足
- 狂犬病死亡病例：34%患者未清洗傷口、72%患者未接受(或未及時接受)疫苗治療、<1%之患者曾接受抗血清治療

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WHO 狂犬病控制之標準做法

1. Epidemiological Surveillance (疫情調查)
2. Mass vaccination (疫苗注射須高於>70%---含流浪狗)
3. Dog population control (狗口控制---寵物登記、流浪狗控制)



資料來源 From:
 a. WHO No. 931 Technical Report (2005), p. 30
 b. Rabies surveillance in the United States during 2005 (CDC).
 c. http://www.who.int/rabies/relevant_documents/en/index.html

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Kansas 大學獸醫學院狂犬病診斷中心蝙蝠病例

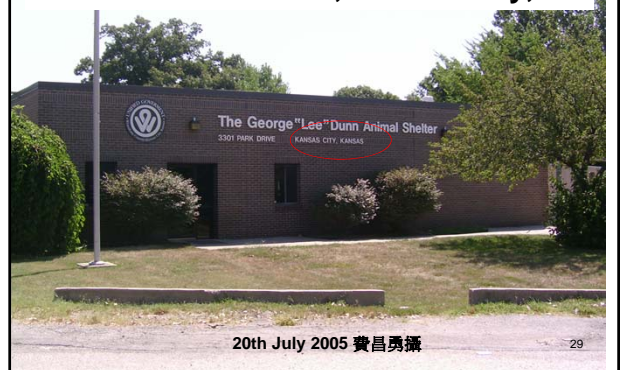
26th July 2005 費昌勇受邀參訪時攝

中國國產之活毒疫苗毒株

- 目前WHO僅承認SAG2株或基因重組之VRG株是安全的減毒疫苗。中國犬貓用疫苗未使用WHO推薦之安全毒株。
- 中國狂犬病疫苗有：(1) Vero細胞組織培養之狂犬病ERA株，包含在五合一疫苗內(狂犬、犬瘟、副流感、腺病毒、犬小病毒)。(2) BHK21細胞培養之Flury LEP減毒株。
- 中國藥品生物製品檢定所董關木教授、與衛生部張永振博士等均發現：狂犬病臨床市街毒株之DNA序列與國產活疫苗ERA毒株相似性達99.1%。
- WHO的活毒疫苗剪毒標準：(1)對野生嚙齒類經口、肌肉與腦內注射都必須無病原性，(2)疫苗施打後3~4天內唾液內不能有任何病毒出現。

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Rabies Quarantine at George Lee Dunn Animal Shelter, Kansas City, KS



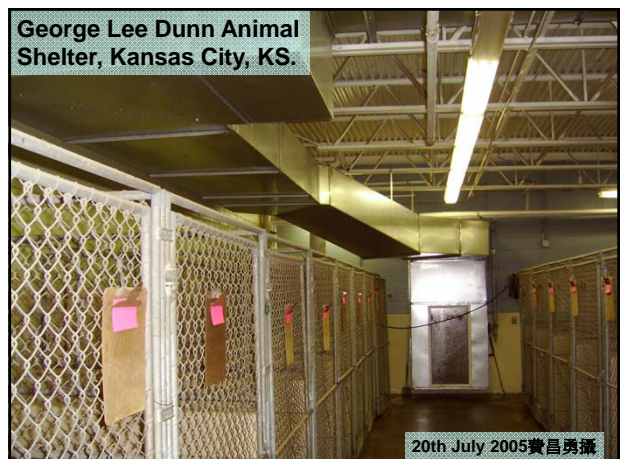
20th July 2005 費昌勇攝

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Kansas 大學獸醫學院狂犬病診斷中心收件室

26th July 2005 費昌勇受邀參訪時攝



George Lee Dunn Animal Shelter, Kansas City, KS.

20th July 2005 費昌勇攝