

Survey on the dog meat industry and possible measures to end the dog meat trade in South Korea (English)

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The English report is partially translated from the Korean report.

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Chapter3 Breeding(1)

Disease control in dog farms and overuse antibiotics

Summary

Problems of collective breeding are also found in bovine and hog. Collective breeding necessarily entails accumulation of excrement, environmental stress. Also inevitable are existence of pathogen and use of vaccine, antibiotics, as well as chemical used for sterilization. There seems to be no solution to the antibiotic build-up in livestock product for the current livestock industry.

In the same context, most animals at the animal shelter suffer from respiratory diseases after admission but there is no solution to the issue as well. There are no systematic disease control for animal shelters operated by local governments, animal protection groups, and veterinarians.

A systematic operation, proper facilities, vaccine, sterilization, and antibiotics are crucial in addressing the issue. Various animal farms use a broad range of antibiotics and distribute their meat and related products without proper testing process.

Disease control regarding dog breeding also lacks a systematic approach. Relevant health authorities have research data on conventional livestock products but there are barely any researches on companion animals. Stronger safety test, regulation based on legalization is not a solution to the tolerance to antibiotics and steroids, as well as side-effects to drugs.

Tolerance to antibiotics in Korea is in a grave situation and Korea's level of antibiotics-resistance is at the highest level among other countries. Numerous reports on the antibiotics abuse point to livestock products where high dose of antibiotics is mixed to the feed, and use of drug without subscription is prevalent. Use of antibiotics is regarded as a necessary process in livestock industry and the only solution is to convert to a method of breeding that respects animal rights. Dog farms as well have serious antibiotics abuse issues.

1. Disease control in Animal Shelters

There is almost no research data on disease control in local dog farms. At the same time, animal shelters, another form of collective breeding, have limited data on

disease control. Thus, we will use existing data on animal shelters and compare them.

Operation of animal shelters is mostly commissioned to local governments, veterinarians and animal protection groups. It has been more than 10 years since the first animal shelter opened but without a systematic approach, it has now become a hotbed of contagious disease and most of the animals at the shelter are exposed to respiratory diseases.

Animal shelter in Gwangju has an in-house vet. The shelter ran a disease monitoring on animals admitted in 2008, when there was no disease control system in place. Other animal shelters in Korea have no veterinarians and most of the animals at the shelter are exposed to serious respiratory problems, measles, Parvoviral Enteritis and other infectious diseases.

<Table 3-2> Status of disease in dogs after admission at Gwangju Animal Shelter, 2008

Category	Diseases	Number(%)
Internal medicine	Upper respiratory infection	256(22.4)
	Canine distemper	105(9.2)
	Parvo virus enteritis	23(2.0)
	Total	384(33.6)
Dermatology	Fungal infection	6(0.5)
	Decubitus ulcer	10(0.9)
	Total	16(1.4)
Ophthalmology	Keratoconjunctivitis	3(0.3)
	Keratic ulcer	3(0.3)
	Total	6(0.6)
Total		406(35.5)

Respiratory disease caused by various pathogens is a serious issue in collective breeding facilities around the world and there are many reports on the issue. Dog farms are not free from the issue as well and it is allegedly reported that they use massive amount of antibiotics and steroid to control respiratory and digestive

diseases.

Status of health of dogs after admission to Gwangju Animal Shelter, 2008¹.

- After admission, 406 cases (35.5%) developed new diseases not recognized at the time of admission.
- Most of the diseases were infectious. Respiratory disease such as upper respiratory system infection, pneumonia, and bronchitis (dog measles excluded) accounted for 63.1% (256 cases).

Disease control of abandoned animal shelters in Korea²

- ① Almost all mid-large size shelters lack disease control.
- ② Disease control is the foundation of shelter operation and it has the biggest effect on overall operation. Shelters with good disease control will have high admission rate, which will lead to low rate of mercy-killing, and reduce the cost of treating dead animal bodies. It will improve the image of shelters and will be able to provide educational opportunities to local communities.
- ③ Mid-large size shelters admit and breed multiple number of animals, and therefore has high possibility of infection.
- ④ Most of deaths at the shelter is assumed to be attributable to infectious respiratory disease, Parvoviral Enteritis, measles, general leukopenia but are currently labeled collectively as “natural death” without further specific clarification.
- ⑤ Facility design, animal sorting, vaccination, sanitation, sterilization, employee education, volunteer education, stress reduction, are all related to disease control.
- ⑥ Disease control must be enhanced by hiring in-house vets and conducting continuous employee education.
- ⑦ Disease control is not a serious issue to small shelters but to mid-large size shelters with collective breeding structure and high density of animal population. In US and Europe, the rate of death by illness is a measure to disease control. They differentiate animals that died after treatment from those died without treatment.
- ⑧ Death by illness is up to 20% in Korea, but at mid-large shelters, death rate is higher than 30%. Large scale shelter A showed 76% rate of death by illness, which is highest in the country.
- ⑨ Current system of outsourced medical treatment cannot handle diseases at the animal shelter. Small animal shelters might be in a different situation.
- ⑩ Large scale shelter B, which has an in-house vet, is maintaining death rate under 5%.

⑪ An in-house veterinarian can design and implement overall disease control system including vaccination, sterilization, animal sorting, mercy-killing, as well as medical treatment and thus any mid-large sized shelter must be able to hire necessary man-power. They must first be equipped with facility, and allow in-house vet to manage disease at the shelter, give medical care, administer mercy-killing, and neutralize street cats, which will be more effective in many aspects.

2. Disease control at dog farm

(1) Hotbed of infectious disease

There are barely any researches on diseases at the dog farm. Researches cover only endoparasites and heartworm. It is assumed that the situation must be as worse as in animal shelters where group of dogs are kept in cages.

Since there is no disease control, bacteria, virus, ectoparasites, endoparasites, and fungi are highly infectious and transmittable. Considering the situation at the animal shelters, the status of disease control is assumed to be worse.

Former research on endoparasite and heartworm shows there is a high rate of infection. Roundworm and heartworm are categorized as a disease communicable between men and beasts. Heartworm infection rate is high in Korea, especially for dogs bred outdoors. Heartworm is transmitted by mosquitos, parasites in the heart and causes lesion. Its larva and the larva-discharged hematozoon named woobachia migrate to other organs to cause various lesions. Endoparasites parasitic in organs migrate to other organs and cause various lesions.

Most dog farms do not take preventive vaccinations against hearworms nor endoparasites. Considering the fact that most dogs are bred outdoors, their infection rate to heartworm is expected to be very high. Such poorly managed health makes dogs suffer from diseases, and at the same time, makes the animal unsuitable source of meat for human.

- Out of 165 heads of dogs bred at a dog farm in Seoul area, 83 heads of dogs(50.3%) were infected with endoparasites and 23 heads of dogs(20.2%) were infected to heartworm³.

- Out of 206 heads of dogs bred at a dog farm in Daejon area, 18 heads of

dogs(8.7%) were infected with heartworm⁴.

- Out of 200 heads of dogs bred at a dog farm in Gwangju and Chunnam area, 8 heads of dogs (4%) were infected with heartworm⁵.



<Pic 3-15> Excrement left untouched for a long period of time: a mix of excrement and pest is giving foul smell

Excrement will cause bad odor, and proliferate bacteria and virus which will migrate with pests. Sterilization is meaningless when the floor and cage are contaminated with feces and hair, and then a vicious cycle of uncleanness and disease will continue. In Korea, breeding area for dogs are permitted when registered as a pen. Applied standard is same as that of cows and pigs. Dog farms are managed under the livestock administration system without any research conducted on the characteristics, status, and disease on dog breeding.

(2) Health



<Pic 3-16> Young pups with osteochondrodysplasia: front legs are curved in both pups

- Pups are malnourished because they are fed with food waste after the breastfeeding period. Most dog farms are located in remote area where sunshine is scarce because of relevant law and civil complaint. Locked in a cage where the sun doesn't shine, dogs lack vitaminD necessary to grow bones.
- Locked in a cage for months, dogs are bored and stressed from being packed with other dogs and constant bad odor. Stress hormone will only make the dogs weak with low immune system, and susceptible to hormonal disease as hyperadrenocorticism.
- It was confirmed that a number of dogs were packed in a cage. It is natural for dogs to fight to rank themselves and it is no different to dogs in a cage. Some will get hurt and die from the wound when left untreated.

3. Antibiotics and steroid abuse at the dog farm

- Dog farms generally use antibiotics and steroid to control measles, parvovirus, various respiratory and digestive diseases but abuse of drugs led to tolerance against antibiotics and relevant innate problems.

Recently, legislators passed an act making it mandatory to get subscription for antibiotics to address residual antibiotics on livestock products and human body tolerance to antibiotics.

(1) Relevant News Articles

- You are eating your pet dog (KBS Consumer Report, Jul.11, 2008)

Dog meat is not a stamina food – it can do harms to you

Dog breeding environment was shockingly filthy. The floors of corridor between cages were covered with feces making it difficult to pass by. Their food was also mixed with feces. Animals faces were covered with feces and food waste.

We could not but ask to ourselves: how are diseases controlled in this kind of environment?

Most commonly used drugs at the dog farms were antibiotics, synthetic potent antidiarrheal, and dermatology drugs. The manager said they administer 15-20cc of drugs in three shots to a 20kg dog. For animals, 0.08-0.1cc is the adequate amount per kilogram, and the manager is clearly administering more than 10 times higher

dose to animals. If people were to consume such meat without allowing enough withdrawal period, it could be lethal to human body causing tolerance to antibiotics, says Honorary President of the Korea Association of Animal Hospitals, Kang, Jongil⁶.

- Dog soup is not a stamina food. Why? (Hankook Ilbo, Jul.4, 2011)

He explained that it is very dangerous to eat dog meat in the modern society where factory farms breed animals for meat purposes, regardless of species. Dogs are sensitive and active animal, and the stress of collective breeding will make the animal susceptible to diseases. Because they are bred in a small area, one disease in one dog can spread bacteria or virus to all other dogs in the breeding area. This makes breeders to use excessive amount of antibiotics and in turn, consuming the dog meat means consumers will be eating the meat soaked in drug.

Mr. Ha said he realized the gravity of the issue when one of his patient who operated a dog farm in the past, told him that excessive amount of antibiotics is used at the farm on a daily basis. He warned, “Consuming meat concentrated with high level of antibiotics will cause severe toxic effect in human body, and will cause endocrine disruption in the long term and eventually lead to cancer and diabetes.”⁷

- Dog meat and antibiotics – confess of a veterinarian (Ministry of Justice Website Board)

I confess that I have done shameless things as a veterinarian and apologize for my wrongdoing.

One day a pet dog died at the hospital. The owner asked me to take care of the dead body. He didn't even bother to come back. I had no idea what to do with the dead body. There was no place for burial. To leave it in the open was not a good idea as it was a hot summer day. Then my assistant tipped me that a 'dog soup restaurant' will be of help. I called the number he gave me, and in less than 10 minutes a young man arrived on a bicycle.

He weighed the dog and said it is approximately 3 *Gwan*(3.75kg) and gave me KRW 15,000. He added that it is KRW 5,000 per *Gwan* because the dog is dead. A breathing dog, regardless of its illness or disease, is KRW 8,000 per *Gwan*. It was the beginning of a dirty trade.

Dogs with terminal cancer or months of pneumonia were taken to the restaurant if the owner did not want it back, and I could profit from the medical bill and the meat.

There were days when we sent five to seven dogs to the restaurant.

The restaurant asked if we have cats, because no one could know if it is served in a soup. I welcomed any opportunity to earn extra cash. I was shameless.

I saw dirty patient dogs sold to the restaurant for meat purpose. They didn't care if the flesh started to decompose. There was no reason for me to turn down the offer because I had to take care of the dead body anyhow. I was shameless.

I must not be the only one who sent rotten dog to dog soup restaurants. Most of the vets that had a business in big cities in the 1970's would have handled dead or ill dogs in the same manner. No one told what happened there. Such dog meat was called *Tsubushi*, and though I'm not sure if it is the right expression, the dogs sold as *Tsubushi* turned into a dog soup and were served to stamina food lovers.

These patient dogs were treated with various antibiotics and eating the meat is like drinking a bottle of drug. Eating the meat would have certainly caused hypertension, diabetes, and stroke⁸.

(2) Tolerance to antibiotics

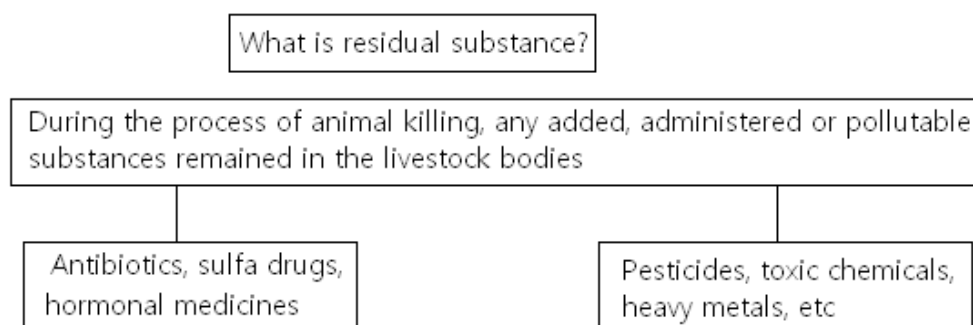
What is a residual substance?

A substance added, administered, or polluted in breeding of an animal, that resides in the skin and flesh.

Animal drugs including antibiotics, sulfa drug, hormones

Pesticide, fungi toxin, heavy metal

<Table 3-3> Definition of residual substance



(Source: The issue of resistance to antibiotics, Lee, Younhee, 1998)

Every bacterium has different structure and metabolism therefore does not respond to antibiotics in an identical manner. Some bacteria are originally resistant to certain

antibiotics. Penetration of antibiotics is different between gram-negative bacteria and gram-positive bacteria structure and accordingly the efficacy of antibiotics is different. We have basis concentration to each bacteria (no side-effects to human body), and the bacteria not dead at the basis level is called antibiotics-resistant bacteria. For example, *Klebsiella Pneumoniae* causing pneumonia is killed at 10 $\mu\text{g/ml}$ and over amoxicillin. Bacteria that are active in sputum of a patient administered with amoxicillin, it is a bacteria resistant to antibiotics.

(3) What makes bacteria resistant to antibiotics?

- Did not use the antibiotics that accurately target the infection- causing bacteria.
- Did not use the accurate amount of antibiotics. The amount of antibiotics must be sufficient to kill the bacteria.
- Did not keep the administration cycle and duration. If the hour of use is not kept properly, the level of antibiotics concentration in blood falls below effective level, and the dying bacteria will start to attack the body.
- When bacteria becomes resistant to antibiotics, it can be infectious not only to the patient but to others. The person who is infected with an antibiotics-resistant strain of bacteria, he/she will suffer from the disease and have difficulty finding the right medication for treatment. Recent research revealed that STD and TB have high tolerance to antibiotics.
- Side-effects of cross-tolerance cannot be neglected. Cross-tolerance means, when a body is resistant to certain drug, then the body will be resistant to other medication that has identical or similar chemical structure or mechanism of action. For example, tetracycline, aureomycin, aelcomycin, and chloromycin are antibiotics with cross-tolerance⁹.
- Antibiotics abuse in agriculture, fisheries, and livestock products will eventually lead to emergence of tolerant strain of bacteria, and such strain will transmit the tolerant DNA to bacteria infectious to human, or be damaging to human body through consumption of agriculture, fisheries, and livestock products. Therefore partially controlled use and fact-finding is crucial¹⁰.

(4) Tolerance to antibiotics in Korea

Tolerance to antibiotics in Korea is the highest in the world. One of the major cause is assumed to be abuse of antibiotics in livestock products.

Rate of tolerance to penicillinG on gonococcus is 91% in Korea, made the top among other countries. It is significantly higher than that in New Zealand(19%), or

HongKong and Singapore(60%). Intermediate tolerance or ratio of tolerant bacteria to penicillinG on diplococcus pneumoniae is highest in Korea with 84%, significantly higher than Philippines(15%), New Zealand(18%), and Singapore(38%). Korea does not have strong basis for sales and controlled use of antibiotics for animals, and thus the possibility of abuse and misuse is high. Usage amount of antibiotics is higher than advanced countries.

By types, amount of usage was high in tetra-cycline and penicillin. By livestock species, the highest amount was administered to pigs. As for additive antibiotics, 6 types of antibiotics for both man and animal including penicillin were permitted for use. As for treatment purpose, fluoroquinolone and 3rd generation cephalosporin were used. Antibiotics that are highly risky causing tolerance bacteria, cross tolerance, and tolerant DNA transmission, are fluoroquinolone, cephalosporin, aminoglycoside, macrolide, and penicillin¹¹.

<Table 3-4> Meat product volume and use of antibiotics in major countries

Country	2002			2003		
	Meat product volume (1,000 ton)	Antibiotics (ton)	Antibiotics per 1 ton of meat	Meat product volume (1,000 ton)	Antibiotics (ton)	Antibiotics per 1 ton of meat
Korea	1662	1355	0.82	1776	1273	0.72
US	38988	9983	0.26	38911	9158	0.24
Norway	270	11.5	0.04	275	11.7	0.04
Sweden	557	17.3	0.03	551	16	0.03
UK	3340	430	0.13			

(Source: Risk control in antibiotics used for both human and animal, FDA, 2007)

- Antibiotics no longer effective (Hangyerae Daily, Dec.3, 2003)

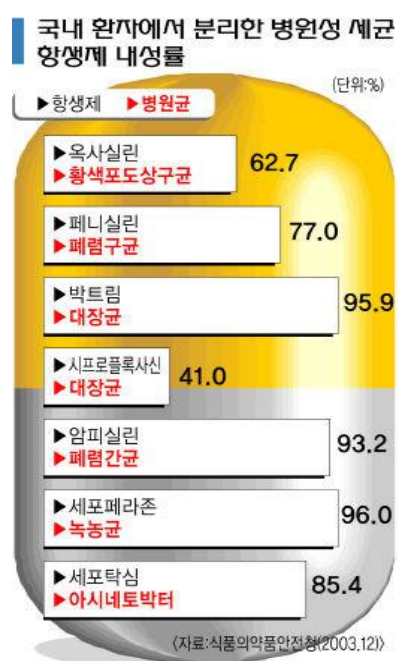
The first nationwide survey reveals, pneumonia patients' tolerance rate to penicillin is 77%, highest in the world

It is found that pathogenic bacteria samples from patients and healthy individuals had world's highest level of tolerance to various antibiotics including penicillin and tetra-cycline. At the same time, bacteria samples from livestock such as cow, pig, and chicken, food poisoning bacteria samples from livestock and fisheries product and processed foods, as well as pathogenic and general bacteria samples from soil,

underground water, and river near to livestock farms had antibiotics-tolerance higher than before. Antibiotics will lose efficacy when bacteria has higher resistance to antibiotics.

Such fact was revealed when the FDA of Korea conducted the first survey on antibiotics tolerance fact-findings with National Veterinary Research and Quarantine Service, National Fisheries Research and Development Institute, Korea Centers for Disease Control and Prevention, and university hospitals.

<Table 3-5> Tolerance rate of pathogenic bacteria sample from Korean patients



(Source: Korea Food and Drug Administration, 2003, 12)

Professor Song Jaehoon of Sungkyunkwan University Medical School and his team took sample of infectious bacteria from patients in eight university hospitals for four months during July to October last year and researched the rate of tolerance to various antibiotics. The result showed that tolerance to penicillin on diplococcus pneumoniae was 77%, tolerance to oxacillin on staphylococcus aureus was 62.7%, highest in the world. When the tolerance rate is 77%, it means use of antibiotics will have only 23% of efficacy <Table 3-5>.

Bactrim tolerance on e.coli is 95.9%, ampicylin tolerance on klebsiella pneumoniae is 93.2%, and cefoperazone tolerance on pseudomonas aeruginosa was as high as 96%. Professor Song and his team evaluated whether antibiotics were used

properly at the university hospital and revealed 73.1% were not using antibiotics in a proper manner.

The Korea Food and Drug Administration collected samples of beef, pork, chicken, and fisheries, sashimi, and fish meat products sold in five major cities including Seoul and Busan during March to October. The analysis came out showing 2-18% were carrying pathogenic bacteria. Among them, the vibrio parahaemolyticus causing enteritis were 100% tolerant to clindamycin. Other bacteria showed higher than 80% tolerance to tetra-cyclin, and 30-60% tolerance to penicillin, streptomycin, erisromycin, and amphyccilin¹².

- Tolerance to antibiotics – cow

Research on samples collected from cows in Busan and Kyungnam area from March to October 2007 showed that out of 600 samples, 92 samples (15.3%) had e-coli, and were tolerant to doxycycline(73.9%), tetracycline(70.7%), and cefazoline(63%), in the mentioned order. The result shows abuse and misuse of antibiotics in cow is significantly high and must be regulated for health of human body¹³.

- Tolerance to antibiotics – chicken

Feces sample collected from 26 chicken farms in six areas in Korea from April 2005 to October 2006 had 251 samples of e.coli and 214 sample of enterococcus spp. Tolerance to antibiotics of these bacteria samples were; e.coli tolerance to antibiotics including tetracycline(88.8%), nalidixic acid(68.1%), ampicillin(59.8%), streptomycin(57%), while E.faecium, E.faecalis tolerance to antibiotics were tetracycline(66.4%, 85.9%), bacitracin(61.5%, 64.1%), erythromycin(54.9%, 62%). The result shows abuse and misuse of antibiotics in cow is significantly high and must be regulated¹⁴.

- Tolerance to antibiotics – pig

377 feces sample were collected from 40 pig farms in five areas in Korea from April 2005 to October 2006 to test e.coli and enterococcus spp. tolerance to antibiotics. The result showed that e.coli was highly tolerant to almost all antibiotics in the order of tetracycline(92.6%), ampicillin(68.3%), streptomycin(68%). E.faecium and E.faecalis tolerance to antibiotics were in the order of tetracycline(57.9%, 98.7%), erythromycin(69.2%, 66%). The result shows abuse and misuse of antibiotics in cow is significantly high and must be

regulated.¹⁵

Chapter 4 Breeding (2)

Risks of feeding dogs humans' leftover food

Summary

Some argue that feeding leftover food to dogs is an environmental-friendly breeding and an effective food way to manage food waste.

Leftover food is contaminated with human saliva which can be carried by the dog to cause orally transmitted disease, infectious disease communicable between men and beasts(zoonosis), or food-poisoning in animals, and therefore is not suitable as feed.

Leftover food fastly decomposes and contaminated by pests as rats, cockroaches, flies and could be a source of contamination and disease.

Epidemiologic investigation on disease communicable between men and beasts is limited to rabies, burcellosis, and heartworms.

Large dose of heavy metal that accumulated in the organs and caused internal body malfunction is detected in dog meat. Heavy metal is assumed to be accumulated through feeding leftover food and low-end feed (food waste, feed made with ramains from slaughter houses).

There is no research dealing with the subject of dogs as food. Yet, there are cases where disease was stemmed from using dog meat.

1. Introduction

Korea Dog Meat Farmers Association publicly argues on the positive aspect of dog breeding using food waste and lables it as “environmentaly-friendly breeding,” and quotes a research paper to back-up their argument that using leftover food to breed dogs will give benefit humans with dog meat and food waste treatment. They also argue that abandoned animal should be given food waste rather than dog dry feed.

Leftover food is contaminated with human saliva, food waste, and remains from slaughter houses and fish processing manufactures. There is a high possibility that human saliva could be carrying hepatitis virus type A, B, and C, as well as orally

transmitted pathogen. Animal remain from slaughter houses and fish processing manufacture could carry unknown pathogen as well.

Nobody knows what these pathogens might mutate inside the body of an animal that was fed with it. There is no fact-finding or research on this issue.

US meat and its alleged relevance to mad cow disease were caused by feeding animal feed to cows, and there is a high possibility that it could cause bodily disruptions in human.

The virus that caused SARS (mutated coronavirus) in Guangdong, China in 2002, is assumed to have been originated from dogs and cats collectively bred for meat in a bad sanitary conditions.

Zoonosis originating from animals, such as avian influenza (AI), or swine fever (pig cholera) are publicly well-known diseases. However, the danger of dog meat bred with leftover food is not widely known to the general public.

Dog related diseases that are known to harm humans are rabies, brucellosis, and heartworms. There were recent reports on brucellosis infection in veterinarians and in employees in the related industry. The public health authorities ran a research limited to conventional livestock products. Even at a time when the market for companion animal is growing sharply, there is no epidemiological investigation on companion animals, dogs, and human.

Diseases communicable between men and animals are extremely threatening to people with depressed immune system. Cancer patients, organ transplant patients, AIDS patients, patients under steroid treatment, chronic alcoholics, and splenectomy patients can suffer from serious symptoms and can be highly sensitive to such diseases.

2. Leftover food related data

Dogs bred for meat are the best treatment mediums for food waste. (Joongang Daily, May 5, 2010)

Dogs bred for meat happens to be the best solution to food waste. Mr. Ahn, Yongkeun, professor of Food and Nutrition Department at Chungcheong University,

also known as Dr. Dog Meat, said 1,240,000 heads of dogs in Korea processes 1,260,000 tons of food waste every year, in his research published in <Korea Food And Nutrition Journal>. Professor Ahn argued in his report that, “cows, pigs, chickens, and ducks are fed with stock feed, but dogs are fed mostly with food waste” and that “the amount of waste processed by dogs accounts for 19.3% of total food waste generated locally (5,520,000 tons, Ministry of Environment Data, 2008.) He added, “governments spent KRW 633.2 billion to process food waste (KRW 120,000 per ton) in 2008 alone” and therefore “food waste processed through these dogs amounts to approximately KRW 128.9 billion annually.”

Professor Ahn calculated the volume of processed food waste assuming that Tosa hybrid eats daily average of 2.5kg, while Korean bred dogs eat 1kg. Professor Ahn said, “farmed dogs used to be stigmatized as the culprit of environmental damage because of its manure release” and pointed out that “gains by processing food waste is significantly greater than damage caused by manure release.” In addition, the professor says dogs are ‘eco-friendly’ animals, because unlike cows, pigs, chickens and ducks, dogs do not get food-mouth disease, or SARS, and thus does not need to be destroyed and cause environmental damages. He also argues that it is better from an environmental perspective to use stray dogs for dog meat rather than euthenising them and producing waste.¹⁶

Dog food is expensive. Therefore I use food waste.

It takes time and efforts to collect food waste from restaurants, schools, military units, and companies. Automation is not available and therefore 500 heads of dogs is the upper limit for one person to breed. Dog food is expensive and cannot make both ends meet.

Food waste, remains from slaughter house and fish processing manufacturer is grinded in a mill to prevent small pieces of bones stuck in throat or intestines. Animals are fed once or twice a day. Sometime they are fed once in two days to prevent accumulating fat. Many farms boil the feed to prevent disease.¹⁷

3. Factfinding



<Pic 3-18> flies sitting on the leftover food



<Pic 3-19> boiling leftover food



<Pic 3-20> filthy cages and leftover food

All dog farms give leftover food to dogs. As the picture shows, pests including flies, cockroaches, and rats are always around and migrates bacteria and virus.

Leftover food is given as it is or boiled. Not many farms give water to the dogs. Dogs will eat the food only because of hunger and high salinity. In this case, salinity cannot be easily discharged outside the body and will eventually push up the blood pressure. In the long term, the organ related to excretion will be initially damaged, followed by organ damages in liver, kidney, and heart.

Leftover food contains onion and garlic which can cause organ damages in dogs' bodies acting as oxidants. Some could suffer from acute symptoms and chronic damage can lead to organ failure.

Contaminated leftover food has high possibility of causing viral enteritis or protozoan enteritis. Dog farms use high dose of anti-diarrheal, antibiotics, and steroids to control diseases.

4. Disease infected by eating dog meat

There is no research on dog meat in Korea and other countries. Data is extremely limited.

Gaesoju, a broth made of dog meat and herbs, related disease

Koreans generally prefer stamina foods. Healthy food market is very big in Korea. *Gaesoju*, a broth made of dog meat and herbs, is one of the favorites. Both oriental medicine and western medicine doctors highlight the danger of *gaesogu* and argue the broth must be banned. Following is information highlighting danger of consuming stamina food and related liver damage. Gaesoju case is included.

Professor Kim, Dongjoon of Internal Medicine at Hallim University, analyzed toxin hepatitis by so-called stamina food and medicine (Kookmin Daily, Oct.2, 2010)

No matter how good the stamina food may be to your liver, abuse and misuse could fatally damage your liver. Multiple uses, injection, consumption of over-the-counter drugs, oriental medicine, and stamina food could damage liver function.

During his research on toxin hepatitis by so-called stamina food and conventional medicine, Professor Kim, Dongjoon of Hallim University found 47 cases of liver function damage by use of *Baeksun*(*Bongsam*) which is believed to be effective to

diabetes and liver cancer.

Professor Kim said abuse and misuse of following materials including *Hasuo*(13 cases) *InjinSsuk* (12 cases) *Hyangoe Carp*(7 cases) *Gaesoju* (4 cases) *Sanghwang Mushroom* (4 cases) *Elm Tree*(3cases) *E.senticosus* (3 cases) *Pumpkin extract*(3) *harts horn*(2) *centipede*(2) *Hovenia dulcis*, *Boel tree*(0) *Red ginseng*(2) *Chitosan*(2) *squalene*(1) *Aloe*(3) will not help but damage the liver.

Liver is like a chemical plant in human body and plays a leading role in metabolism of food and drug, and detoxing.

Professor Kim said, “all medicine could be an effective drug and a potent poison at the same time” and warned, “no matter how balanced your diet may be, overuse could cause problems (i.g, metabolic syndrome). Food that is good to most people could cause damage to certain person(i.g, peanut allergy).”

He argued, “such dual aspect is applied ‘without exception to every ingredient’ consumed, including drug, food, and oriental medicine” and said “some toxic liver damage may not be identified under thorough clinical trial. Therefore a continuous monitoring system such as post-sales survey is necessary.”

In Korea, there is a monitoring system for side-effects of commercial drugs but monitoring on oriental medicine, stamina food, and folk remedy is on a marginal level¹⁸.

Analysis of acute hepatitis and liver damage patient, Choongnam Medical University

During a five year period, starting from March 2003 to March 2008, the frequency of acute hepatitis and liver damage by cause were, 53 cases of TypeA Hepatitis (13.6%), 46 cases of TypeB Hepatitis(11.8%), 4 cases of TypeC Hepatitis(2.8%), 159 cases of Toxin hepatitis(40.9%), 22 cases of Auto-immune hepatitis(5.7%), and 98 cases of Alcohol hepatitis(25.2%). Frequency for toxin hepatitis was the highest. Among the toxin hepatitis patients, damage by folk medicine were 54 cases(34%). By the ingredient of folk medicine were, Bongsam 14, Injin SSuk 7, ginseng 6, kudzu 6, Sanghwang mushroom 4, E.senticosus 3, harts horn 2, and 1 each for licorice, Korean angelica root, Chinese yam, Hwangyoung, Jijak, Yak-Hasu, Hovenia dulcis, Red ginseng¹⁹.

Human infection relevant to dog meat consumption overseas

Human trichinellosis confirmed by consumption of dog meat, 2001

81 cases of human trichinellosis were confirmed in China from 1974 to 1999,

mostly in North-eastern area. As a result of inspection of 19,662 heads of dogs in 9 areas in North-eastern area of China, by each region, infection rate ranged from 7% to 39.5%. *Trichinella larga* is invisible to naked eye. It goes into human body in the form of larva. Pigs can also be infected²⁰.

There is no report on trichinellosis in Korea, but were reports of internal parasites and heartworm infections. This proves that dog farms failed in parasite control and dog meat consumption could lead to possible human infection of roundworm, trichinella, and heartworm.

At dog farms in Seoul area, out of 165 heads of dogs, 83 (50.3%) were carrying parasites, and 23 (20.2%) were infected with heartworm²¹.

At dog farms in Daejeon, out of 206 heads of dogs, 18(8.7%) were carrying heartworms²².

At dog farms in Gwangju and Chonnam, out of 200 heads of dogs, 8 (4%) were carrying heartworms²³.

Outbreak of Cholera in North Vietnam, dog meat source of vibrio cholerae in Summer of 2008²⁴.

In December 14, 1912, a South Pole Expedition team from Australia fell in crevasse and disappeared. Luckily, they had 10 days of food for themselves but nothing for the dogs. Mawson and Mertz hurried their way back to the camp. During their 315 miles of trip, they had the sleigh dogs eat dog meat, tough, rough, and left with no fat. Dogs did not protest while being eaten by others. People ate dogs' liver and brains which caused A-hypervitaminosis in Mertz who suffered from deterioration of strength, stomach ache, failure to move, and mental anxiety. He eventually died in January 1913. Mawson returned to the camp alone²⁵.

5. Dog meat consumption and orally transmitted disease

Leftover food fed to dogs is contaminated with human saliva, and pests can carry various types of pathogens. There is no research on such possibilities. Such pathogen and parasites can be transmitted to human and there is high risk of such contamination.

Definition: infectious digestive disease orally transmitted by contaminated food, hands, water, insect, animal, or dishes.

Waterborne Disease

Method of transmission

- ① Discharged by excretion, vomit, nasal discharge, sputum, cough, sneeze of a patient or pathogen carrier, contaminating food, drinks, or hand and transmitted orally.
- ② Pests that contacted excretion contaminate food, and migrate orally transmitted disease bacteria.

Infection differs by the amount and type of pathogen, and sensitivity of the host

Characteristics

- ① Collective and explosive outbreak
- ② Seasonality: common in summer (high temperature and humidity)
- ③ Affected by regional characteristics
- ④ Relevant with preference to food and economic situation
- ⑤ short period of incubative stage
- ⑥ High onset rate because of multiplication in food
- ⑦ Tendency to accumulate in animal intestines

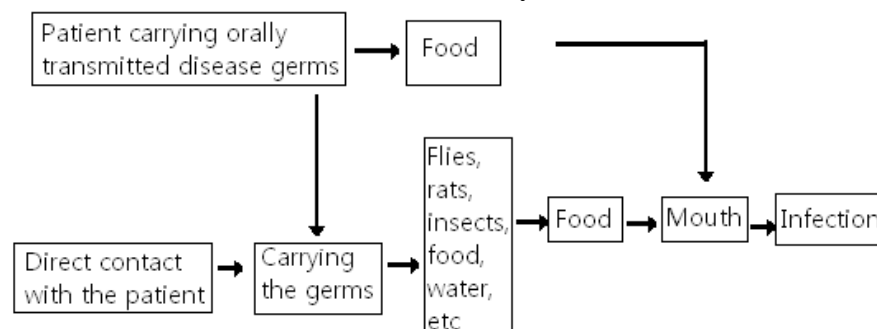
(Food and Nutrition Science, Kundong University, 2010)

<Table3-6> Difference between orally transmitted disease and bacterial food-poisoning

	Orally transmitted disease	Bacterial Food poisoning
Infection relation	Forms infection cycle	Terminal infection
Amount of bacteria	Small amount of bacteria could cause infection	Requires certain amount of bacteria
Secondary infection	Frequent	Almost none
Incubation Period	Long(difficult to identify pathogen)	Relatively short
Prevention	Almost impossible	Possible when multiplication is deterred
Drink	Infected by drink	Barely infected by drink (bacteria is diluted)

(Source: Food and Nutrition Science, Kundong University, 2010)

<Table 3-7> Route of Infection of Orally transmitted disease



(Source: Food and Nutrition Science, Kundong University, 2010)

<Table 3-8> Type and characteristics of orally transmitted disease

Name	Pathogen	Incubation Period	Route of Infection	Symptom
Typhoid	Salmonella	3-60 days (1-3 weeks)	Water, food, raw fruit, vegetable, milk, dairy, clams	continuous fever, infrequent pulse, headache swelling of liver and spleen, boredom, loss of appetite, dry cough
Cholera	Vibrio	6h-5days (24H)	Portable water, food(fisheries), fruit, vegetable	acute diarrhea
Bacillary	Shigella	12h-7days (1-3 days)	Drink, food, direct/indirect contact with patient or carrier	Mild or no symptom. Often shows, high fever, spastic stomachache, diarrhea, blood or puss in stool
Paratyphoid	Salmonella	1-3 weeks	Water, food, milk, dairy product	continued high fever, headache, swelled spleen, rash, diarrhea. Similar to typhoid but minor symptoms
Polio	Polio virus	3-6 days (inapparent) 7-12 days (paralysis)	Direct contact infection or droplet infection by esophagus discharge and stool	<ul style="list-style-type: none"> Non-paralyzing type: fever, boredom, headache, diarrhea Paralyzing type fever, muscle pain, cervical and back stiffening, flaccid palsy

Hepatitis	Hepatitis Virus A,B,C	A: 15-50 days B: 45-108 days C: 15-150 days	<ul style="list-style-type: none"> ■ Type A : water, food, Syringe, blood agents ■ TypeB : wound, kiss, sexual contact, Syringe, vertical infection between mother and child ■ TypeC: Syringe, donated blood, sexual contact, vertical infection between mother and child 	<ul style="list-style-type: none"> ■ Type A has fever, loss of appetite, muscle pain, fatigue, diarrhea ■ Chronic TypeB has fatigue, lethargy, jaundice, loss of appetite. Complications are, cirrhosis, vein bleeding, enlarged spleen, and hydrops abdominis ■ Chronic TypeC has cirrhosis
Scarlet Fever	Beta-hemolytic	1-3 days	droplet infection and direct transmission via excrement, food, milk, dairy	throat pain, fever, headache, stomach ache, throat inflammation, rash, raspberry tongue, mycopus exudate in tonsil or throat, swelling in cervical lymph node
Diphtheria	Coryneb	2-6 days	Contact and droplet infection, food in some cases	fever, upper respiratory inflammation, infection in stomach coat or skin

(Source: Food and Nutrition Science, Kundong University, 2010)

6. Dog-related disease communicable between men and beasts

There are many bacteria that could cause a disease communicable between men and beasts. Korean health authorities monitor part of such diseases, including endoparasites, rabies, brucellosis, and heartworms.

Health risks are high to those who treat and consume dog meat, because of using leftover food, inadequate and filthy breeding environment, pest exposure, and disease control by generalists.

Transmission

Such disease can be transmitted between men and animals in two methods.

• Direct transmission

When a sensitive individual contacted secretion(blood, urine, feces, saliva) of an individual carrying the disease

• Indirect transmission

An individual sensitive to the disease can be infected by a substance that contacted with an organism of an individual exposed to the disease.

Dog related diseases communicated between men and beasts (partial)

1) Animal bites and scratches

Human body symptom

Edema, pain, body fluid discharge, loss of function in bitten area, fever

Hematosepsis – it could be life-threatening.

2) Bubonic Plague

Cause – *Yersinia pestis*

Human body symptoms

Lymph node swelling, fever, pneumonia

Dark spots on skin leading to death (Black Death)

3) *Camphylobacter*

Cause – *Camphylobacter jejuni* (bacteria)

Human body symptoms

Acute gastro-intestinal illness – categorized as food-poisoning

Diarrhea, vomit, stomach-ache

Healthy person could heal on its own in a short period of time.

4) Cutaneous larval migrans

Cause – larva of a dog hookworm migrates into human body through skin (*ancylostoma braziliense*, *ancylostoma caninum*)

Human body symptoms

Hypodermic congestion, acute itching. Starts from the toe and migrates 2-3mm per day.

5) Giardiasis

Cause - *giardia lamblia* (protozoa)

Human body symptoms

Condition and duration of diarrhea differs to the level of pathogen.

Patient could suffer from abdominal pain and uncomfortable feeling.

6) Lyme Disease

Cause – *Borrelia burgdorferi* (spirochete bacteria)

Human body symptoms

Tick bite could leave flare.

Generally, patient shows fever, lethargy, and joint inflammation.
Heart lesion confirmed in some patients.

7) Psittacosis

Cause – Chlamydia psittaci (bacteria)

Human body symptoms

Symptoms appear 1-2 weeks after exposure

Respiratory illness as fever, anxiety, headache, cough, and pneumonia is confirmed.

Often causes heart problems.

Miscarriage, uterine infection is confirmed at the later stage of pregnancy.

Not a life threatening disease.

8) Rabies

Cause – Rhabdovirus or Lyssavirus (virus)

Human body symptoms

Pain and swelling in bitten area.

Incomplete and complete paralysis; paralysis and swelling in larynx area make it difficult to swallow food and causes pain. The diseases make the patient to fear water, and are also called as Hydrophobia.

Might lead to death.

9) Salmonellosis

Cause – Salmonella typhimurium (bacteria)

Human body symptoms

Stomach ache, vomit, diarrhea. Acute gastrointestinal illness is general.

Possibility of blood infection as in animals.

10) Shigellosis

Cause – Shigella (bacteria)

Human body symptoms

Stomach ache, vomit, diarrhea. Acute gastrointestinal illness is general.

Possibility of blood infection as in animals.

11) Visceral Larva Migrans

Cause –

Toxocara canis (dog roundworm)

Toxocara cati (cat roundworm)

Baylisascaris procyonis (raccoon roundworm)

Human body symptoms

Consumed helminth egg will hatch and the larva will cause initial symptom.

Larva migrates to internal tissue and organs to cause inflammatory symptom.

The patient will show fever, cough, and respiratory illness.

Symptoms can show in the eyes. Migration of larva might cause congenital blindness in children.

12) Anthrax

Cause – Bacillus anthracis (bacteria)

Human body symptoms

Symptoms will show in the skin. Red spots will show in 1-7 days after exposure.

Spots will darken and show necrosis and lesion.

Affected area will move to blood vessel to cause organ failure.

Might cause pneumonia.

Death rate is relevant with the level of exposure. More than 50% will die if initial treatment was unavailable.

13) Babesiosis

Cause – Babesia divergens (protozoa)

Babesia microti

Human body symptoms

Fever, chill, headache, fatigue could last more than 2-4 weeks.

Naturally healed in most cases.

14) Brucellosis

Cause – Brucella canis in dogs

Human body symptoms

Lymph node swelling, fever, headache, chill, fatigue for a long period of time.

15) Colibacillosis

Cause – Escherichia coli (E.Coli)

Human body symptoms

Acute gastrointestinal illness as vomit, diarrhea, stomach ache.

Rarely develops to sepsis.

16) Cryptosporidiosis

Cause - *Cryptosporidium* (protozoa related to the common coccidia organism)

Human body symptoms

Most patients show no symptoms, or slight illness.

Immune-depressed patients could suffer from diarrhea, fever, weightloss, and dehydration.

Could damage various organs and could be life-threatening.

17) Dipylidiasis

Dipylidium caninum (tapeworm)

Human body symptoms

Most patients show no symptoms. Might have a slight digestive illness.

18) Echinococcosis

Cause – *Echinococcus granulosus* (tapeworm)

Human body symptoms

After consumption, helminth egg will hatch and migrate to multiple organs and morph into a cyst to grow. Symptoms could differ by the size of a cyst.

It could take 5-20 years to show a clinical symptom.

19) Ehrlichiosis

Cause - *Ehrlichia canis* (bacteria – rickettsia)

Human body symptoms

Fever, lethargy

20) Encephalitozoonosis

Cause – *Encephalitozoon cuniculi*

Human body symptoms

Mostly no symptom.

Immune-depressed patients could show various symptoms.

21) Hantavirus

Cause - Hantavirus (Sin Nombre strain) (virus)

Human body symptoms

Respiratory symptoms, lung edema, pneumonia

Often fatal.

22) Leptospirosis

Cause

Various strains of *Leptospira* (bacteria)

L. canicola (dogs)

Human body symptoms

Mostly no symptoms.

Fever, weakening, lethargy.

Testicle pain

Skin flare

Kidney illness

Liver illness

23) Newcastle disease

Cause – Paramyxoviridae (Newcastle disease virus)

Human body symptoms

Acute conjunctivitis

Fever, lethargy, loss of appetite

24) Q-Fever

Cause – *Coxiella burnetii* (bacteria – rickettsia)

Human body symptoms

Fever, lethargy

Heart problems including endocarditis.

Headache

Symptoms might last for 2-3 months

25) Streptococcus

Cause – Streptococci, many different species and strains (bacteria)

Human body symptoms

Pus in the wound, necrosis and lesion

Neck pain

Heart illness

Scarlet fever

26) Trichostrongylus

Cause – Trichostrongylus different species (intestinal worm)

Human body symptoms

Mostly no symptom.

Digestive symptoms as vomit, diarrhea, stomach ache.

27) Tuberculosis

Cause – Mycobacterium different species (bacteria)

Human body symptoms

Respiratory symptoms as cough, hemoptysis

Fever, weight loss, lethargy

Skin lesion

28) Bordetellosis

Cause – Bordetella bronchiseptica (Bacteria)

Human body symptoms

Respiratory symptoms as cough, rhinorrhea, pneumonia

(Source: America Heart Association Guideline, 2010)

7. Dog meat consumption and heavy metal poisoning

Large amount of heavy metal that accumulates in human body and damages bodily function was detected in dog meat. It is assumed that use of leftover foods and low-end feed (food waste, animal remain from slaughter houses) are the source of heavy metal.

There are metallic elements good and bad to humans. Iron, zinc, copper and cobalt are necessary to human body while lead, arsen, and cadmium are highly toxic and a very small amount of harmful metal could be lethal. Lead, arsen, and cadmium are not an original component of an organism. It is a contaminant mixed into the breeding process of animals or processing of food. It is an environment contaminating heavy metal²⁶.

Heavy metal cannot be degraded and difficult to discharge in bodies or soil. Once it

is accumulated in a body, the amount will concentrate along the food chain. Therefore, heavy metal contamination in food is a serious problem to the end users, human²⁷²⁸²⁹.

In particular, lead and cadmium are toxic substances commonly found in food. These toxic substances are lethal that strongly sticks to organic tissue, accumulates in body, and is eliminated slowly. It could cause acute and chronic poisoning. The most well-known health crisis caused by lead, arsen, and cadmium, are Itai-Itai Disease erupted in Japan because of cadmium poisoning. Arsen in beer in the UK, and arsen in powder milk caused a number of death in Japan³⁰³¹.

Media report on heavy metal detection in dog meat

You are eating your pet dog (KBS Consumer Report, 2008)

We requested Health and Environment Research Institute to run a test with the help of Seoul City Government. We had 17 dog meat samples collected in Seoul and Gyeonggi area, and 10 *Gaesaju* samples purchased over the internet. We asked to test these samples of food poisoning bacteria (general bacteria, e.coli, salmonella), antibiotics (antimicrobial compound, antibiotics), and heavy metal(lead, arsen, cadmium). The test result was stunning. (Refer to the test result)

개고기 및 개소주 검사결과 (총 27건)

일반세균 4건
대장균 8건
황색포도상구균 1건
납 2건

총 15건

<Pic 3-21> Sanitation test result of dog meat and *Gaesaju*

Against the standards laid out in *Livestock Product Processing Act*, out of 17 dog meat samples, 4 came out with higher than standard level of general virus, 8 came out with higher than standard level of colon bacillus, and 1 came out with higher than standard level of staphylococcus aureus. Using the standards of Korean Food

Standard Codex, 1 sample of dog meat and dog liquor had higher than standard level of lead. 15 out of 27 samples were above standard.

It is far too higher than beef or pork inspected by Seoul Metropolitan Government last year, where only 2 samples out of 700 had virus.³²

Heavy metal and food poisoning bacteria found in dog meat sold at restaurants in Seoul (Newsis, Aug.7, 2008)

Consumers need to be aware of the fact that dog meat sold at restaurants in Seoul was detected with heavy metal and food poisoning virus. Seoul City Government took 14 samples of dog meat sold at restaurants in Seoul area last month. Inspection result shows some of the samples were detected with heavy metals as lead, arsenic, cadmium, and general virus, colon bacillus, and staphylococcus. This result was reported on August 7, 2008.

According to the test results, there are no legal standard but as for lead, minimum of 0.003mg to maximum of 0.029mg was detected in 1kg of meat. In 1kg of meat, 0.088mg-0.402mg of arsen, 0-0.001mg of cadmium was detected.

As for general bacteria, min of 135.2 to max of 381.6 count was confirmed in 1g or 1cm². Min of 808 to max of 927 count of E.coli virus was detected. Staphylococcus aureus, a food poisoning virus was detected in 3 cases out of 14 samples.

During the same period, chicken and duck meat were tested. General bacteria and e.coli count was within standard, and no food-poisoning virus was found.³³

Heavy metal and food poisoning virus found in dog meat sold at restaurants in Incheon (YTN 2000-12-10)

The Veterinary Service Laboratory Incheon Office collected 79 samples of dog meat and duck meat sold in traditional markets in Incheon since June. Inspection result showed that 4 samples of dog meat and 2 samples of duck meat contained heavy metal.

Dog meat containing lead carried 0.5ppm, which exceeds provisional standard of International Food Standardization Committee of 0.4ppm. The Laboratory assumed that dog and duck might have taken heavy metal from food.³⁴

- Few days before the Last of Three Dog Days (*Mal-bok*) in 2003, 14.7 tons of dog

meat contaminated with potassium cyanide was found and seized in Zhejiang Province, China. It was reported that dogs were poisoned to death using cyanide because it is difficult to beat dogs to death in rural areas. This was not the first. Dog meat containing poisonous material was seized in 2002 China. Dog meat is generally used in North-eastern area where Yanbian Korean Autonomous Prefecture is located. A portion of dog meat is smuggled to Korea because it is very cheap. At the moment, there are no governmental regulations to ban such trade.³⁵

- The Veterinary Service Laboratory Incheon Office collected 50 samples of dog meat sold at traditional markets in Incheon on December 2000. The hazardous residual material test on samples showed, 10% (5 samples) were detected with 0.02 ~ 0.5ppm of lead. Two samples had lead higher than 0.4ppm, the standard of lead in pork and beef set forth by the Codex Alimentarius Commission. It is assumed that dogs took lead from soil, food container, and left over food. When consuming lead contaminated dog meat for a long period of time, it could cause stomach ache, nausea, and diarrhea, and neural damage³⁶.

- In August 1998, a representative of animal testing lab and dog meat wholesaler was caught by slaughtering 5,600 heads of dogs that were used in bacteria or virus vaccine research, or dogs died of diseases such as pneumonia, and distributing the meat to restaurants and stamina food sellers in Seoul and Metropolitan area for three years. The animal testing lab provided test dogs to pharmaceuticals and labs, and then took 860 head of dogs used in vaccine research for 'live rabies virus vaccine' and sold to Moran Market and Pyeongtaek Market. The wholesaler slaughtered 4,800 heads of dogs died of pneumonia or enteritis, or used in lab tests, and sold the meat to restaurants and stamina food sellers in Seoul Kangnam, Incheon, Eujeongbu, Shingal, Anyang. It is assumed that many restaurants and stamina food sellers knowingly purchased and used such meat³⁷.

How metal poisoning affects human body

Zinc, iron, copper, and cobalt are heavy metal necessary for human body to sustain its function. Though these metal elements are necessary to human body, over usage will damage the basis of balancing metals and show toxic effect. For example, excess intake of copper could cause hemolytic anemia, capillary damage, and organ damages as liver. Cobalt causes fatal changes to blood forming organs as well. On the other hand, mercury, lead, and cadmium are environmental contaminants

needless and toxic to human body. Heavy metal that damages bodily function tends to accumulate easily in the body.

Lead poisoning

Lead is one of the highly toxic heavy metals. Long term intake of meager amount of lead will cause strong toxic effect in the body, resulting chronic poisoning. Symptoms include anemia, loss of appetite, indigestion, cranial nerve damages caused by deterred hemoglobin synthesis and reduced life cycle of blood cells. International Research Agency for Cancer(IRAC) categorized lead into Group 2B, as a substance suspected to be carcinogenic to human.³⁸

Cadmium poisoning

Cadmium is a heavy metal used to determine the level of contamination of a certain contaminated area. It originated from the waste water generated from smelting process of zinc, copper, and lead, as well as fertilizer in farms. Phosphate fertilizers contain considerable amount of cadmium.³⁹

It is pointed out that high number of patients with circulatory system failure such as hypertension is found in areas that are significantly contaminated with cadmium and many die or suffer from anemia. It is assumed that cadmium interfere absorption of divalent ions, including copper, zinc, and iron. Long term exposure to cadmium is known to cause anemia, bone loss and nodule⁴⁰. It causes back pain, bone fracture, and osteoporosis in female over 40⁴¹. IRAC categorized cadmium into Group1 which is carcinogenic to human.

Arsen poisoning

There are no specifics found on the physiological function of arsen in human body. It is known to have harmful effects only when used in excessive amounts⁴².

Arsen is a metal element used in medicine, pigments, preservative, and pesticide. Arsen itself is not highly toxic but an arsenic compound such as arsenious acid, arsenic chloride, and calcium arsenate is dangerously toxic. Arsen poisoning shows symptoms as contracted esophagus making it difficult to swallow saliva. Intake of arsen leads to acute or chronic poisoning, causing digestive illness as acute stomach ache, vomit, diarrhea and skin cancers as basal-cell carcinoma and epidermoid carcinoma⁴³.

<Table 3-9> Target organ by heavy metals

Heavy Metal	Target Organ
Cadmium	Kidney, lung, liver
Chromium	Lung, respiratory organs, skin
Mercury	Kidney, brain
Tin	Spleen, heart, lung, brain
Tellurium	Liver, kidney
Lead	Blood forming organ, kidney, brain
Nickel	Skin, brain
Arsenic	Liver, skin, all organ

(Source: Ecotoxicology, Kim Oshik, 1990)

Heavy metal remain in the blood

The research on heavy metal remains in blood (Disease Control Center, 2005) shows that blood remains is higher with age. Relevant survey data show higher age groups tend to consume more stamina foods, such as dog soup and *Gaesoju*. Food safety test result shows high level of heavy metal in stamina foods. Older age groups that generally enjoy stamina foods are highly likely to be exposed to the intake of heavy metal remains.

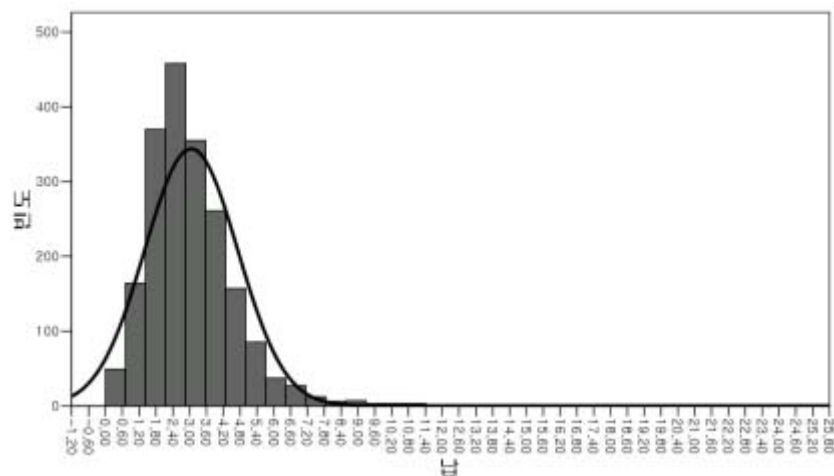
Blood lead concentration

Average (arithmetic) of blood lead concentration was $3.06\mu\text{g}/\text{dl}$ ($0.08\text{--}24.09\mu\text{g}/\text{dl}$). Distribution of sample, excluding those who has worked in areas with lead exposure, is as shown in the following table. Average (arithmetic) of blood lead concentration was $3.02\mu\text{g}/\text{dl}$ ($0.08\text{--}24.09\mu\text{g}/\text{dl}$.)

Average (geometric) of blood lead concentration in all samples was $2.66\mu\text{g}/\text{dl}$. By age groups, 20's were $2.25\mu\text{g}/\text{dl}$, 30's $2.52\mu\text{g}/\text{dl}$, 40's $2.77\mu\text{g}/\text{dl}$, 50's $2.85\mu\text{g}/\text{dl}$, and over 60's were $2.84\mu\text{g}/\text{dl}$, higher concentration in higher age groups. By gender, male showed $3.06\mu\text{g}/\text{dl}$, while female showed $2.31\mu\text{g}/\text{dl}$. By residing areas, *Dong* residents showed $2.63\mu\text{g}/\text{dl}$, and *Up-Myeon* residents showed $2.77\mu\text{g}/\text{dl}$.

Compared to National Health and Nutrition Survey of other countries, the results showed high concentration than those in US, but lower than those in Germany. Compared to those in China and Japan, Koreans showed lower blood lead concentration.

<Table 3-10> National Level of Blood Lead Concentration (Ordinate: Frequency / Abscissa: Lead)



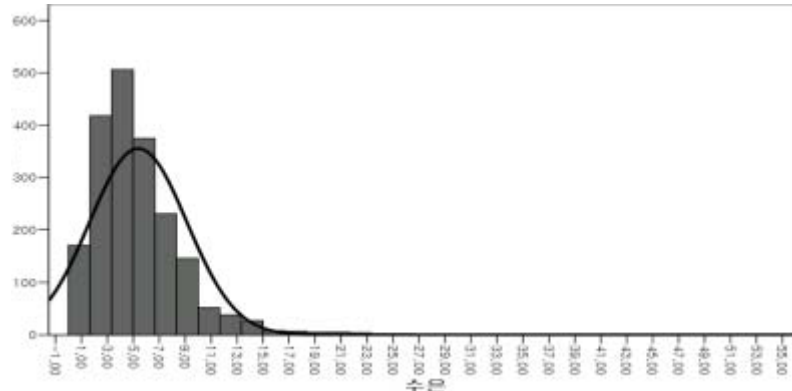
(Source: Korea Centers for Disease Control and Prevention, 2005)

Blood mercury concentration

Arithmetic average of blood mercury concentration was $5.38\mu\text{g/l}$ ($0.07\text{-}55.94\mu\text{g/l}$). Arithmetic average of the sample excluding those who has work experience with mercury exposure, was $5.28\mu\text{g/l}$ ($0.07\text{-}55.94\mu\text{g/l}$).

Geometric average of blood mercury concentration was $4.34\mu\text{g/l}$. By age group, 20's were $3.98\mu\text{g/l}$, 30's were $4.18\mu\text{g/l}$, 40's were $4.79\mu\text{g/l}$, 50's were $4.52\mu\text{g/l}$, and over 60's were $4.06\mu\text{g/l}$. By gender, male showed $5.01\mu\text{g/l}$, while female showed $3.76\mu\text{g/l}$, higher in males. By residing areas, *Dong* residents showed $4.28\mu\text{g/l}$ while *Up-Myeon* residents showed $4.58\mu\text{g/l}$, slightly higher in up-myeon residents. The only local research on blood mercury concentration used 235 samples of adults (Ho, Moonki, 2003) and result was $3.2\mu\text{g/l}$, lower than our research. Compared to National Health and Nutrition Survey of other countries, Koreans' level of blood mercury concentration was higher than that of US and Germany. The level of concentration differed by countries, as $0.42\text{-}2.76\mu\text{g/l}$ in US, $0.29\text{-}0.91\mu\text{g/l}$ in Germany, $3.5\mu\text{g/l}$ in China, $18.2\mu\text{g/l}$ in Japan, and $2.0\text{-}8.4\mu\text{g/l}$ in Norway.

<Table 3-11> National Level of Blood Mercury Concentration (Ordinate: Frequency / Abscissa: Mercury)



(Source: Korea Centers for Disease Control and Prevention, 2005)

Blood cadmium concentration

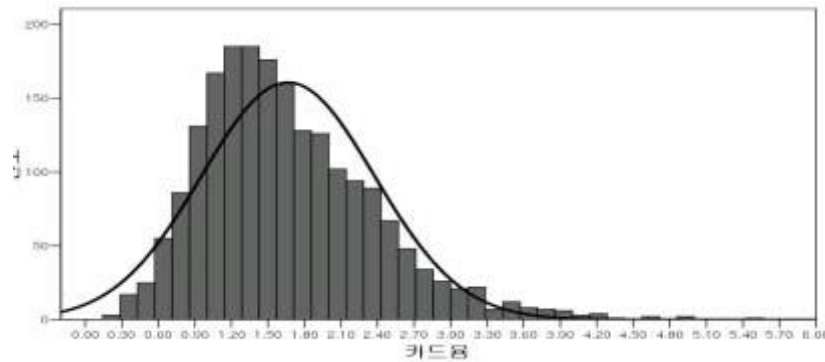
Arithmetic average of blood cadmium concentration of whole sample was $1.66\mu\text{g}/\ell$ ($0.18\text{--}5.52\mu\text{g}/\ell$). Arithmetic average of the sample excluding those who has work experience with cadmium exposure was $1.67\mu\text{g}/\ell$ ($0.18\text{--}5.52\mu\text{g}/\ell$).

Geometric average of blood cadmium concentration of whole sample was $1.52\mu\text{g}/\ell$. By age group, 20's was $1.46\mu\text{g}/\ell$, 30's was $1.42\mu\text{g}/\ell$, 40's was $1.53\mu\text{g}/\ell$, 50's was $1.58\mu\text{g}/\ell$, over 60's was $1.63\mu\text{g}/\ell$, highest in over 60's age group. By gender, male showed $1.55\mu\text{g}/\ell$, and female showed $1.48\mu\text{g}/\ell$, higher in male group. By residing areas, *Dong* residents showed $1.51\mu\text{g}/\ell$, and *Up-Myeon* residents showed $1.56\mu\text{g}/\ell$.

95 percentile of the whole sample showed cadmium concentration of $2.97\mu\text{g}/\ell$. By age group, age group of 50's showed highest concentration of $3.21\mu\text{g}/\ell$. 95 percentile of female showed $3.04\mu\text{g}/\ell$, which was higher than $2.91\mu\text{g}/\ell$ in males. 95 percentile of up-myeon residents was $3.10\mu\text{g}/\ell$, higher than *Dong* residents.

Blood cadmium concentration of whole sample excluding work experience with exposure to cadmium was $1.52\mu\text{g}/\ell$ and showed no difference to whole sample. Distribution by age group, gender, and residing area showed no difference to whole sample. Compared to National Health and Nutrition Survey of other countries, blood concentration of cadmium was higher than that of US and Germany, but did not exceed WHO recommendation of $5\mu\text{g}/\ell$ for ordinary citizens. Only one(1) sample showed blood concentration exceeding $5\mu\text{g}/\ell$.

<Table 3-12> National Level of Blood Cadmium Concentration (Ordinate: Frequency / Abscissa: Cadmuim)



(Source: Korea Centers for Disease Control and Prevention, 2005)

Status of Heavy Metal in Livestock Products

- During a period of July-December 2009, a total of 172 samples of beef(60), pork(47), chicken(44), and duck(21) were collected from large food stores for inspection purpose. Cadmium and arsenic level was within standard. However, standard exceeding level of lead was found in one(1) case each in beef, pork, and duck, and two(2) cases in chicken.⁴⁴
- Lead contained in meat products distributed in Korea were 0.49mg/kg; 0.2828mg/kg in beef, 0.0917mg/kg in pork, and 0.1532mg/kg in chicken, higher than standard.⁴⁵

Chapter 5 Transportation

1. Introduction

Dog slaughtering process takes place mostly late night to dawn. Transportation to slaughterhouse also takes place during very early time or very late time. Very few are seen during daytime and dogs are visibly suffering in small cages. These dogs have been born and raised in small filthy cages, and their first outing is not so different. According to a person working in the industry, they use small cages to prevent dogs from fighting and wounding one another, and keep them alive until they are transported to the sales spot. Sellers also want to get as many heads of dogs as possible in one move to save the cost of transportation. Caged dogs were barely able to breathe during transportation. The level of stress these dogs go through peak when they see other dogs electrified and slaughtered in front of their eyes.



(source: <http://photo.naver.com/user/limon7711>)



<Pic 3-22> Transportation of dogs seen on the road



<Pic 3-23> Wire cage used to carry dogs

Recently, there was a shocking and cruel image on TV. Dogs were eating other dogs in the cage on truck. Following is the related report.

2. Related Report

- Unknown truth about dog meat dealers - Dog Eating Dogs (NewsN, Nov.9, 2011)

Shocking truth about the dogs on truck is revealed. 'TV Animal Farm' of SBS TV aired an episode on dogs in transportation and there was a scene which showed dogs eating other dogs. Reporters came to check the dog meat dealer's truck.

The truck in concern had cages full of dogs. Many were lethargic. On the floor was a dead body of an animal. Other dogs gnawed meat off the dead body that has already started to decompose and unable to identify original body shape⁴⁶.

Transportation of dogs has been a hot issue after some citizens found cages of dogs piled high over one another on a passenger ship to Jeju from Mokpo. It was a sizzling hot summerday, temperature up to 35°C. Dogs were visibly stressed. Some were dead and some vomited. Among them were dogs that might have been abandoned, or lost judging from the breed (Saint Bernard, Labrador Retriever, Golden Retriever, Jindo Dog, Great Pyrenees, Siberian Husky, Yorkshire Terrier), and some were young pups. This kind of scene of dog suffering is a well-known secret, but the report has shocked many.



<Pic 3-24> Dogs suffering during transportation. (Source: TV animal farm, broadcasted in 2011. October. 9)

- Dog meat dealer truck on a passenger ferry, the cruelty of animal abuse shocks many (Chosun Daily, Jul.24, 2012)⁴⁷

Tens of dogs packed in a small cage

Dogs are scared, and some die

Photos and witness on the internet aroused criticism, arguing it is a “national disgrace”

A photo of dog dealer’s truck on a passenger ferry via Jeju aroused internet users’ fury. The photo shows dogs packed in a small cage, barely breathing and too tired to beg for rescue. Dogs suffered from heat and fear, and some were utterly stressed and angrily chewed the cage trying to get out.



<Pic 3-25> Dog truck on a passenger ferry from Jeju

(source : <http://4199427.blog.me/>)



<Pic 3-26> Saint Bernard dogs on the truck (source: <http://4199427.blog.me/>)

3. Relevant Legislation

- Animal Protection Act (Ministry of Food, Agriculture, Forestry, and Fisheries)

Article 9 Transportation of Animal

- ① Those who transport animals and were designated by the Ordinance of Ministry of Food, Agriculture, Forestry, and Fisheries for animal transportation shall make efforts to comply with the following.
 1. Provide proper amount of food and water to the animal in transport. Prevent the animal from getting shocked or injured by not making sudden departure or putting on a brake.
 2. **The vehicle transporting animals shall be designed to prevent animals from getting injured, and minimize pain from fluctuation of temperature or difficulty of breathing.**
 3. Transportation of ill animals, young animals, pregnant or lactating animals shall be protected from other animals.
 4. Animals shall be protected when getting on and off a vehicle to prevent from

getting shocked or injured.

5. Electric tool must not be used to herd animals on and off a vehicle.

② The Minister of Food, Agriculture, Forestry, and Fisheries will determine a structure and standard of equipment of a vehicle transporting animals as set forth in Clause 1 and 2, and recommend the use of vehicles that suits such structure and standard.

③ The Minister of Food, Agriculture, Forestry, and Fisheries can determine and recommend on issues regarding transportation of animals other than those set forth in Clause 1 and 2.

There are no penalties related to the ordinance. There is no rationale for or actual cases of penalty. We cannot but be heartbroken at the in-humanitarian situation and raise voices of criticism.

4. Standard on animal transportation of animal shelters

Korea's local animal shelters have no standardized guidance regarding transportation of animals. Abandoned dogs are transported in a cage and by truck or passenger cars without appropriate standard on humidity, heating/cooling, or ventilation.

Following is a standard related to Operation Guideline of Animal Shelters quoted from a research to enhance protection and management of abandoned animals, which was a policy project of the Ministry of Food, Agriculture, Forestry, and Fisheries.

Article 1 Method of transportation and operation

① An animal shelter shall be sufficiently equipped.

② The method of transportation must be safe and secured from other factors, and ventilation or temperature must be well adjusted (to prevent heatstroke and frostbite).

③ The method of transportation must minimize stress during transportation.

④ The method of transportation must clearly and visibly show the name and contact of the animal shelter. The driver must always drive safe.

⑤ The method of transportation must be designed in the most convenient and humanitarian perspective considering animals getting on and off the vehicle.

⑥ The driver must be trained to give first aid to injured or ill animals.

- ⑦ Rescue workers must move and be equipped with capture and transportation gears upon reports of distressed or injured animals.
- ⑧ Rescue workers must immediately check and inspect the status upon arrival and take necessary actions.
- ⑨ Cleaning and sterilization of cage and rescue equipments must be performed on a daily basis.
- ⑩ Cage and equipments used to transport individuals suspected of infectious disease, or individuals confirmed of disease by the vet, must be sterilized immediately after use.
- ⑪ Rescue workers must be a team of two. (based on 1,500 heads admitted per year)⁴⁸.

Chapter 6 Slaughtering process

Summary

- The process of dog slaughtering is based on the method that is used for industrial animals as bovine and hogs.
- There are international studies on humanitarian slaughter of dogs. Current method of slaughtering dogs used in Korea is not accepted in the international community, rather it is considered inhumane and cruel.
- Internationally admitted humanitarian slaughter of dogs is to use proper drugs. However, use of drugs on animals for meat or feed purposes is banned to prevent accumulation in human body and animal that consumed such meat product.
- Slaughtering method on cow, pig, and chicken have continuously raised issues. There is a global research on a humanitarian slaughter of animals. While the method of slaughtering cow, pigs, and chicken have been studied for decades, dogs have not been an issue and it is the biggest reason why dog meat cannot be legalized.
- If research on slaughtering dog is conducted in Korea, the research itself will be a national humiliation. If a method of slaughter is legalized as with cows and pigs, that will also be a national humiliation.

1. Slaughter of dogs in Korea

(1) Method of slaughter in Korea

In general, slaughter of dogs use electrocution using electric shock or give electric shock followed by bleeding. They use electric rods to shock and paralyze the dog for 1-3 minutes and perform electrocution. Or they cut the jugular vein after paralysis and bleed the animal to death. In order to save time, dogs were slaughtered one by one without going into the pending area. Dogs were clearly feared at the scene. Some protested under extreme stress.

There were times when dogs were beaten and burnt or strangled to death but recently, electrocution and strangulation are used at the same time. As for electrocution, 220V of electric rod is contacted to the eye or mouth. People mostly consider electrocution as a form of mercy killing, but the reality was different. Using electric rods did not instantly kill the dog. First contact to electric rod did paralyze the dog but dogs were still conscious. In most cases, two to three contacts with electric rod will finally make the dog motionless. Duration of electrocution differed by slaughter houses. First contact is within two seconds, and follow-on contact required longer contacts. At some slaughterhouses with poor electricity

system, the dog did not lose consciousness after using electric shock. Rather it tried to bite off the electric rod. It is one cruel episode that proved electrocution does not instantly kill the animal.

According to our research, electric shock is followed by plucking, where whole process took two to five minutes. Dogs can hardly be dead in such a short period of time. In such cases, dogs are paralyzed but still conscious to suffer from the pain of plucking and die⁴⁹.

Such measure was used to mercy killing of dog, cat, sheep, pig, fox, mink, decades ago, but is discontinued around the world because of the cruelty of causing extreme pain and stress to the animal. Electrocution induces fibrillation of heart, and causes hypoxia of brain to lead the animal to death. However, the animal does not lose consciousness for 10 to 30 seconds or more after the fibrillation of heart. It is crucial that the animal loses consciousness before electrocution. Sheep and pig are given electro shock to lose consciousness and then use electrocution in slaughter. Slaughter of other animals is performed in two stages.

The danger in this method are, (1) dangerous to human, (2) takes long time, (3) not effective to dangerous animals, (4) not a pleasant scene to see the animal's limbs, head and neck stiffen, (5) fibrillation of heart is not sustained when flow of electricity is cut, and may not kill animals less than 5kg, (6) causes extreme stress and pain⁵⁰.

Strangulation, beating, use of drugs that cause respiratory paralysis are reported. Abovementioned methods are inhumane slaughter not used to dogs worldwide.

In some cases, dogs were killed in front of customers using muscle relaxants. There is a high possibility that use of such drug can be accumulated in the human body. In general, use of drugs that cause respiratory paralysis or heart attack to animals for meat purpose is not recommended for such concerns of accumulation in the body.

When using drugs in mercy killing of animals for meat purpose, chemicals that reside in tissues are prohibited and only the chemicals admitted by FDA (Food and Drug Administration) shall be used⁵¹.



<Pic 3-27> Electrocuted dogs in front of other animals (Source: Korean Animal Welfare Association, 2008)



<Pic 3-28> Slaughter of Dogs (Source: KARA Yellow Dog Fact findings, 2005)



<Pic 3-29> Muscle relaxants used in drug based slaughter (Source: Measures to enhance protection of abandoned animals, Ministry of Food, Agriculture, Forestry, and Fisheries, 2011)



<Pic 3-30> Slaughter of dogs at a goat slaughterhouse



<Pic 3-31> Slaughter area in Moran Tranditional Market: waste water directly goes into sewage



<Pic 3-32> Dragging a dog into slaughter area

(2) Local dog slaughter houses

There is no registration for slaughter houses for dogs. Slaughter is performed at places specializing in dog slaughter in a remote area, or performed in a mass scale at goat slaughter houses. Dog farms, dog soup restaurants, and Gaesoju *sellers* slaughter a small number of dogs to their needs.

Cost of slaughter is KRW 10,000 – 30,000 per head and some slaughter dogs by themselves to save cost. Dog soup restaurants and Gaesoju sellers in Moran market in Sungnam City and Gupo market in Busan City slaughter dogs displayed in front of their restaurants at request.

- Slaughter of dogs at goat slaughter houses

<Table 3-13> Goat slaughter houses in Korea (MIFAFF, 2011)

Area	Slaughterhouse		Cow	Pig	Goat
Inchon	Samsung Food 032-578-2198	This month	908	17116	
	Inchon Seogu Gajwadong 477-4	Accu.	7377	138218	99
Gangwon-do	Pyoungchang Giup 033-333-9248	This month	479	3224	2
	Gangwondo Pyoungchang-gun Yongmyon Jangpyongli 207-3	Accu.	6351	26268	24

Chungchungbuk-do	Chungchoeng Sanup 043-216-7500 Chungbuk Cheongju-si Sangdang-gu Sacheon-dong 607- 15	This month			12
		Accu.			471
	Yeung Silup 043-817-7901 Chungbuk Chungjusi Yongkwandong 12- 9	This month			75
		Accu.			842
	Kunbo Silup 043-645-4965 Chungbuk Jechunsi Songhakmyung Sigokri 869	This month			61
		Accu.			412
Jeollanam-do	Green-black goat 061-373-8005 Chunnam Hwasungun Dongmyon Unnongri 1040	This month			3
		Accu.			3
Kyungsangbuk-do	Saehan Livestock 054-852-2700 Kyungbuk Andongsi Nohadong 569	This month	764	4095	44
		Accu.	6589	26200	324
Jeju-do	Jeju livestock joint market 64-799-5135 Jeju Jejusi Aewolup Oe-umri 2583	This month	343	65581	30
		Accu.	4379	645904	30

The slaughter houses in bold are confirmed to slaughter dogs in large scale.

Some goat slaughterhouses are performing a large scale of dog killing. As seen in the table above, slaughter houses where number of head are small dedicated more hours and space to slaughter dogs, and is assumed to be operating slaughter house for dog meat.

According to the Livestock Safety Management Act, slaughter houses must slaughter animals they are registered to handle. Regarding slaughter of dogs at the goat slaughterhouse, there is no legal basis for regulation and therefore is left unregulated. If such activity is knowingly left without regulation, it can be understood that the government implicitly permits slaughter of dogs at the goat slaughter houses.

Following is an article by Professor Ahn, Yongkeun on livestock slaughter houses.

The so-called slaughter houses are in a situation worse than goat slaughter houses. No slaughter house is registered for dogs and therefore consumers and dealers kill the animal without proper management of waste as set forth in the Act on Management and Use of Animal(Livestock) Excrements. Such inadequate management of waste clearly pollutes surrounding environment. At the same time, it is difficult to monitor if they are slaughtering healthy dogs with no disease or illness, and whether preservation, distribution, and delivery process is safe. One head of Korean dog, *Nurungyi*, will generate 4kg of waste including intestines, feet, fur, and excrement, while that of *Tosa* hybrid is about 6kg. Treatment of intestines require high labor cost and thus 15% of it is used as food.

There are 1,476,776 heads of dogs bred for meat. *Tosa* hybrid accounts for 90% and *Nurungyi* for 10%. Therefore, slaughtering 1,476,776 heads of dogs in one year will leave 7,282 tons of waste annually.

In some cases, conscienceless dog meat dealers inject 20% of water to dog meat through artery using a compressor. In general, boiling 18kg of raw meat will produce 10kg of boneless meat, approximately 55-60% to the raw meat. Meanwhile, boiling meat injected with water will leave only 40% or 7kg of meat. According to Aug.5, 1998 report of Chosun ilbo, representative of an Animal Testing Lab and a wholesale dog meat dealer were prosecuted for distributing 5,600 heads of dogs

used for bacteria and virus vaccine tests or dogs died of disease. Kyoungin Maeil Daily reported on Aug 10, 2003 that Incheon Prosecutor's Office indicted two dog meat dealers that injected water to dog meat to earn unfair profit of KRW 66,000,000. Such report is becoming an annual issue⁵².

2. Pain and stress from inhumane death

Standard on painless death can only be settled when the mechanism on pain is thoroughly understood. Pain is a sense generated by the neural stimulus passing through upper bound neural passage to the cerebral cortex. Under normal circumstances, the passage is relatively not fixed. The neural system has plasticity. Therefore pain is not caused only by activating the passage of the sense of the pain. Stimulus on the peripheral nerve can also cause pain.

The term nociceptor is originated from *noci-* which is to injure and *-ceptive* which is to receive. The term is used to describe input information of neural cells possible to damage a tissue or actually destroys a tissue. Such harmful stimuli acts on idiopathic nociceptors, and acts on other end of sensory nerve that responds to various stimuli from mechanical, heat, or chemical activation to cause neural shockwave. Endogenous chemicals as hydrogen ion, potassium ion, ATP, serotonin, histamine, bradykinin, and prostaglandin can also cause neural shockwave on nociceptor neural fiber. Activation of nociceptor passage can be ignited in receptors sensitive to chronic pain.

Understanding of a continuum that expresses stress and pain is essential in evaluating technique to minimize any pain of an animal facing death. Stress has been defined as physical, physiological, or emotional influence causing changes to a state an animal is comfortable with. An animal's response to stress is an adaptation process necessary to recover normal psychological and physiological state. Such response can include changes of neural endocrine system, autonomic nerve system, and mental state that causes clear change of behavior. The animal response differs by experience, age, breed, and species, as well as the current mental and physical state.

Stress and related response is created when harmful stimuli starts to influence the animal. Medium level of stress is generated when response to stimuli is harmful or is not beneficial. Pain is generated when comfort and peace is hampered.

As with many other processes where animal is related, some form of death requires physical management of the animal. The level of required control and deterrence is determined by the species, breed, size, status of breeding, level of domestication,

existence of wound or disease, level of excitement, and method of mercy killing. For safety of a person performing mercy killing and to protect others and animals, proper management is highly crucial to minimize pain and suffering of animals⁵³.

Following is a guidance on death of an animal widely used worldwide in parallel with OIE (World Organisation for Animal Health). The American Veterinarian Medical Association (AVMA) has following guidelines⁵⁴.

- a. Must be able to cause death without pain
- b. Must take a short period of time to completely lose consciousness
- c. Must take short period of time to death
- d. Must be reliable
- e. Must be safe to performer
- f. Must accompany little psychological pain
- g. Must be highly appropriate to the purpose and necessity
- h. Must have small or no emotional influence to the performer or surrounding people
- i. Must be economical
- j. Must be highly appropriate on histopathological examination
- k. Must consider the efficacy and harmful effect of drugs/chemicals

3. Animals behavior on death

When determining the method of killing, firstly we must consider the pain, fear, and anxiety of an animal. Comfortable adjustment (familiar and safe environment), considerate care, and soft treatment at the time of death has an influence on the animal.

Animals have expression and body language to express their feelings. Behavioral and physiological response to harmful stimulæ are, stressed voice (barking), attempt to escape, defensive aggressiveness, struggling, urination, bowel movement, salivation, anal sac discharge, dilation of the pupil, increased heartbeat, sweating, contraction in reflexive muscle, quiver, and muscular spasm. Not only conscious but also unconscious animals show such response. Some species as dogs, rabbits, and chickens express fear in not moving or pretending to be dead. Such response must not be mistaken as the animal losing consciousness. Barking, behaviour of fear, smell or pheromone of frightened animal cause stress to other animals.

4. Inhumane slaughter of dogs

Research on slaughter and mercy killing of dogs is performed and established worldwide. Method of slaughter performed in Korea are categorized as inhumane and cruel. Some might ask to design a humane method of slaughter, but, such research itself can be criticized globally. The very idea of designing or structuring a method to kill an animal without great pain can hardly be accepted.

These standards are based on humanely slaughtering cows and pigs which has been agonized over years where numerous research has been made.

Mercy killing not accepted as humane, banned, or under campaign to ban are, decompression, use of nitrous oxide, under-water suffocation, beheading, breaking neck-bone, spinal cord pullig, bleeding, electrocution, shooting(permitted in an emergency situation when the animal cannot be safely transported and must perform mercy killing at the scene), aeroembolism, intra-vein injection of nitrogen, use of strychnine (neural stimulant), hydrogen chloride, caffeine, nicotine, magnesium sulfate, potassium chloride, succinylcholine: immediate muscle relaxant), chloride chemicals (sucrostrin, U-THA-Sol, Anectine, Quelicin Chloride, Scoline Chloride), pentobarbital complex causing paralysis of neuromuscle⁵⁵.

OIE restricted inhumane method of slaughtering (2009)

Anesthetize by acetone

Aeroembolism

Use of cyanide

Drowning

Electrocution

Freezing to death

Sole use of Neural muscle blockers (Succinylcholine, Potassium chloride,

Magnesiumsulfate,

Strychnine, Nicotine, Caffeine, Magnesium sulfate, Potassium chloride). Available for use when mixed with sedative

Pesticide, poison, chemicals

5. Current livestock slaughter process and slaughter of dogs

There is no research on the method of slaughter as well as slaughter process on dog meat. The standard we discuss here are based on current method used on cows and pigs but the idea of applying slaughter process on animal that is not researched for meat purpose is inappropriate.

(1) Introduction of HACCP on livestock products

In order to monitor hazardous factors of slaughter house, HACCP (Hazard Analysis Critical Control Point) has been introduced on slaughterhouse for cow, pig, and chicken since 2000.

Food safety control system of livestock based on the HACCP is the concept based on FAO/WHO Codex Alimentarius Commission, and a comprehensive voluntary regulation system as used in advanced countries to control livestock product/food safety. Overseas safety standard(USDA) legislated implementation of HACCP to control treatment process of all kinds of meat and poultry monitored by USDA on July 1996. As an effort to assist specific HACCP plan for livestock product manufacturers, the FSIS of USDA determined general HACCP model on each livestock product processing to be created in industrial scenes. Australia introduced HACCP system in some processing plants, and all livestock processing plant must adopt HACCP system since Jan.1997. Japan also has laid the foundation for HACCP in Slaughterhouse Ordinance in December 1996, pilot testing started in April 1998, and full application started in 2001.

Meanwhile, Korean government amended the Livestock Product Processing Act in December 1998, and legislated regulation to introduce HACCP system to slaughterhouses and livestock product processing plants. Pursuant to Article 9 of the Livestock Product Processing Act and regulation in Article 7 of the enforcement regulation of the same Act, “HACCP for livestock” has been officially announced(MIFAFF Announcement 1998-49) and mandated to be introduced by stages from Jul.1, 2000 – Jul.1, 2003 depending of the size of slaughter. The regulation has set forth regulations and standard of management based on analysis of hazardous materials generated in each stage of material management, processing and treatment, and distribution so that hazardous material cannot be mixed or pollute livestock products. Korea needs a general model developed to introduce HACCP regulation to slaughter houses⁵⁶.

(2) Hazardous factors in livestock products of today

Hazardous factors refer to biological, chemical, or physical factors such as natural toxins, pathogenic micro-organism, chemicals, pesticides, animal drugs residue in livestock products, pathogen of diseases communicable between men and beasts, hazardous parts that can be generated from metabolism of livestock, meat, or milk, parasites, livestock additive that cannot be used in livestock products, coloring, hair,

dust, metal pieces and other foreign objects that cannot be mixed or attached to livestock products.

HACCP refers to a stage or process that can prevent and eliminate abovementioned hazardous factors and secure safety.

<Table 3-14> Biological hazard and growth characteristics of livestock products

Pathogen	Growth Temperature(°C)	pH	Minimum Water Acitivity (Aw)
<i>Bacillus serus</i>	10 – 48	4.9 – 9.3	
<i>Campylobacter jejuni</i>	30 – 47	6.5 – 7.5	
<i>Clostridium botulinum</i>	3.3 – 46	> 4.6	0.95
<i>Clostridium ferfringens</i>	15 – 50	5.5 – 8.0	0.94
<i>Escherichia coli</i> O157:H7	10 – 42	4.5 – 9.0	0.95
<i>Listeria monocytogenes</i>	2.5 – 44	5.2 – 9.6	0.94
<i>Salmonella</i>	5 – 46	4 – 9	0.86
<i>Staphylococcus aureus</i>	6.5 – 46	5.2 – 9	
<i>Yersinia enterocolitica</i>	2 – 45	4.6 – 9.6	

Major biologically hazardous pathogenic micro-organism are, *Bacillus serus*, *Campylobacter jejuni/coli*, *Clostridium botulinum* and *Clostridium ferfringens*, *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Salmonella enteritidis*, *S. typhimurium*, *Staphylococcus aureus*, *Yersinia enterocolitica*.

- Major parasites

Trichinella spiralis,

Taenia saginata ,

Toxoplasma gondii,

Balantinium coli ,

Cryptosporidium spp.

•Chemical Hazard

There are a wide variety of chemical hazard as seen in the table below, including pesticides, antibiotics, hormones, pigments, packages, livestock additives, lubricants, surface coating material, and detergents.

<Table 3-15> Chemical hazard of livestock products

Category	Hazardous factor
Material	Pesticide, antibiotics, hormones, toxin, heavy metal
Process	Livestock additives: preservatives, fragrance
Building and equipment	Lubricant, paint, surface coating material
Sanitation	Pesticide, sterilization, detergent
Storage and distribution	All kinds of chemicals, cross-pollution

- Physical Hazard

Physical hazard includes a wide variety of foreign objects, and such hazard does not normally exist in livestock product but hazardous to human body in the form of disease or damages. Physical hazard can originate from many causes, such as contaminated material, mal-designed or maintained equipment, facility, issues during the process, untrained employees or reckless working process.

<Table 3-16> Physical hazard of livestock products

Hazard	Cause (Material)
Glass	Jar, bottle
Metal	Nut, bolt, wire
Stone	Raw Material
Plastic	Packaging
Bone	Raw Material
Bullet / Syringe	Material used to capture animal or preventive treatment
	Pen, pencil, button
Ornament/Personal belongings	

(Source: Bovine slaughterhouse HACCP Model, MIAFF, 1999)

Abovementioned are hazardous factors applied to livestock products. It is difficult to use the hazardous factors list when there is no research related to dog meat in Korea and overseas.

(3) Livestock Product Slaughter Process

- Safety management standard
- Micro-organism inspection
- HACCP team composition and planning
- Product description creation

- Process flow chart
- Hazard analysis
- Critical points
- Permissible limit
- Monitoring measures
- Improvement measures
- Maintenance of records
- Verification

HACCP guidance has description on the abovementioned stages. It is to prevent hazardous factors from slaughter, carcass, packaging, and distribution stages.

It has been ten years since the HACCP standard for livestock product has been introduced. Issues and problems have been modified and systemized continuously, however, many standards still raises concerns. Factory farm system led to feed mixed with antibiotics, and livestock products have high level of residual antibiotics, which might be the cause of human body tolerance to antibiotics and emergence of super bacteria. Breeding of dogs has also switched to the form of factory farming, and it accompanied reckless use of antibiotics and steroids for disease control. The level of antibiotics is much higher than current level of residual antibiotics in livestock products. At the same time, use of leftover food contaminated with human saliva to feed dogs caused disease communicated between men and beasts, food-poisoning bacteria not verified. Poor breeding environment without proper disease control led to reckless use of antibiotics and steroids. There is no research on diseases on factory farmed dogs, nor data relevant with dog meat related disease.

Dog related researches in Korea are, data collection on rabies, brucellosis, and heartworm performed by Disease Control Center, Health and Environment Research Center, Food and Drug Administration, and Agriculture Promotion Administration, and Sanitation inspection performed in every summer by FDA. Research on a nutritional perspective is conducted from time to time.

To include dog into slaughtering process as is done to cow and pig are considering the two group of animals in same context. However, there are no fact-finding on disease, no system for verification, and no research method for verification on dogs.

An argument that treating dog as same as livestock products when there is zero research on dog, and no scientists studying dogs, in and out of Korea, has a huge inherent fallacy.

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