The transforming growth factor-β1 (TGF-β 1) is thought to be an important cytokine in the regulation of the production, degradation and accumulation of extracellular matrix proteins, and Smad3 is a key modulator of the TGF-β1 signaling pathway. To investigate the influence of Smad3 on liver fibrogenesis, we observed histopathological findings and remarkable protein expression of Smad3-deficient mice liver after CCl_4 treatment. In Smad3-deficient mice, CCl_4-induced liver fibrosis was mild grade compared with the wild type. In a comparative proteomic analysis, different expression proteins of the CCl_4-treated Smad3-KO mice were identified as antioxidant related proteins, such as the senescence marker protein-30 (SMP30), selenium-binding proteins and glutathione S-transferase. In particular, increased the expression of SMP30 in Smad3-KO type could be reflected in significant proteomic changes. These results indicated that the Smad3 pathway was in correlation with the antioxidant defense system within liver injuries.

Our study provides initiative study of Smad3-regulated protein data profiles in Smad3-null mice liver and several specific antioxidant proteins were identified. Therefore, these data suggest that the alteration of specific antioxidant hepatic proteins, by the lack of Smad3 activation, will be bring about TGF-β1-mediated tissue damage. Furthermore, the specific control of Smad3-relavent proteins may be a critical step in the prevention of liver diseases.

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[Session III] #12

Am I Teaching Pathology Effectively?

- current debates and future designs -

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This article is to discuss current issues with regard to how to teach effectively veterinary pathology students in Korea. The old method of teaching veterinary pathology undergraduate courses in most of the 10 veterinary schools in Korea was based mainly in lecture and laboratory classes using traditional methods of teaching. The professor teaches the lecture class and it is usually a one-way learning process. The professor teaches and the students learn. Likewise, the laboratory class is taught by the professor and assisted by instructors. Laboratory class is mainly based on histopathological examination of collected cases. This method of teaching has drawn a lot of criticisms from students in that it is mainly traditional, discipline-oriented, teacher-centered curriculum and morphology-directed instruction.

With the advent of modern hi-tech electronic technologies the present methods of

teaching pathology in most veterinary medical schools tried to use these technologies. The author pioneered in the development of a website in veterinary pathology interlinked with other sites from foreign universities, which the students can access easily at their own pace and time. The use of the internet is a very useful method of teaching but it does not necessarily translate to a more improved learning environment. Nevertheless, it is a rapidly developing environment rich in methods that can be used to present useful teaching materials.

In an attempt to encourage problem-solving skills in students, without increasing staff contact time, interactive problems have been designed for independent web-based use. Problem Based Learning (PBL) and problem-oriented lectures with web-based computer programs are usefully adopted. The ability to describe and interpret lesions is a highly desirable attribute of a veterinary graduate. However, limited opportunities exist for students to develop this skill by observation or dissection of diseased animals. In lectures or tutorials photographs of lesions can satisfactorily present a limited number of problems to students but personal feedback can be difficult to provide. To overcome these problems several methods use E-mail or JavaScript-enhanced web pages to present simple but interactive multi-level problems which require students to enter answers to specific questions before being allowed access to subsequent higher levels. The methods allow students to develop processes of investigation and problem-solving skills. The teaching methods are highly cost-effective, are cross-platform and do not require the use of expensive software packages. They are suitable for the on-line delivery of teaching materials. The state-of-the-art hi-tech methods of teaching using the internet and other web-based sources have their own benefits and disadvantages.

Among the advantages that we noted with the use of the internet and other related websites are the following:

- The influx of data is tremendous. Rapid updating is also achieved and the latest information in veterinary pathology can easily be accessed without the need to go to the library
- Convenience for both the professors and other staff there is no need to prepare the specimen since gross and microscopic pictures in vivid colors can easily be viewed by the students without using the microscope
- Rapid dissemination of notices, exam schedules, report deadline etc. by using the bulletin board of the website

On the other side of the argument, there are also unavoidable disadvantages of this modern system of teaching:

- Too many data and references to study and read this influx of data has the tendency to overwhelm the students. Some students hate pathology because of this reason, pathology takes up most of their time and less time is devoted to other subjects. Because of this, some cunning students only study the items that will be given in the exam. They only study to pass the exams.
- Error in data input and lots of misspellings the website oftentimes are not carefully reviewed and edited unlike

in peer-reviewed international journals. One part of the lesson says this is the lesion diagnosis but in other using the same pictures the diagnosis is different. It is also easy to spot glaring errors like misspellings and grammar.

- Technical glitches this is unavoidable since it is technology-based and problems with the hardware are expected There are times when classes had to be canceled because of the failure to connect with the internet. Computer crash due to virus and worms are also part of this technology
- Expensive this modern system of teaching is indeed expensive. I am talking from the point of view of a Korean. Internet access in Korea is one of the fastest in the world and it is available free of charge with unlimited access in most universities. This type of teaching method using the internet will still be expensive in most developing countries. Internet connection in Korea is excellent and fast that can easily be accessed by students both from their own laptops/desktops or from the laboratories which are connected to the web 24 hours free of charge. This unlimited access to the web is a big advantage for most Korean students
- Bad image/picture representation is also unavoidable in some cases. This is true especially in dealing with congenital anomalies of the heart. It is almost impossible to give an answer to a question based on a 4-dimensional object (like the heart) when the picture presented is basically a flat 2-dimensional representation

The biggest dilemma now is how to assess the success or failure of the different methods of teaching. There is no clear-cut and specific method of assessing such results. The response of the students to the website in terms of number of hits can be considered as their interest and enthusiasm in learning and making use of the different linkages in the website. We also incorporated a built-in method of students' evaluation of the professor. We also encourage e-mails and from time to time we do get nasty and tactless e-mails criticizing the exams given or the too broad references they had to study for the exam. Korea is a democratic country and we welcome such criticisms. Modesty aside, we consider our teaching methods in veterinary pathology excellent and above par in comparison with the other departments. This claim is not only based on electronic data input of students but more important is their personal approval of our department. We do not have problems with recruitment of undergraduate students to do extra hours in specializing in veterinary pathology. Our department is very popular to all the students.

As a faculty member of Chonnam National University I always feel proud and accomplished when our graduates drop by our laboratory and talked with us discussing the usefulness of veterinary pathology to their present line of work. On the other hand we also feel inadequate when some graduates come and tell us that what they learned in veterinary pathology is very irrelevant and useless to the job they now have. Well, I just say "one cannot satisfy everybody all the time". We try to give them all the knowledge in veterinary pathology while they are

students but we cannot teach them everything. Learning does not stop after graduation from college, learning is a lifetime endeavor.

Based on my personal opinion, I finally concluded that the most effective and useful methods of teaching veterinary pathology is the Problem-Based Learning with a variant form called Case-Based Learning for the following reasons:

Problem-Based Learning (PBL) this method can be adjusted either from a website or simply given out as hard copy prints to the students. This method effectively develops the *analytical and critical thinking* skills of the students. The question can be tailored to stimulate critical thinking and analysis even if it is a multiple-choice examination A variant form of PBL is **Case-Based Learning (CBL)** wherein the students are introduced to actual cases or preconceived cases with complete information. In some curriculum distracting materials are introduced to simulate actual cases. To guide students tips and hints are given. Some CBL also requires that student answer in prepared format to ease in the evaluation. It has been found out that CBL is more effective if answered in a group since each member can contribute to the analysis of the case and a discussion can be achieved leading to a more analytic and critical thinking. Other advantages of CBL are the chances to give the students learning experiences that facilitates deep approaches to learning. This method also satisfies the veterinary profession's need for:

- Effective clinical investigation
- Critical evaluation of information
- Improvement of communication and professionalism in veterinary practice
- Understanding veterinary pathology
- Stimulating the students interest and engagement in animal disease
- Developing a broader range of clinical problem solving skills

One disadvantage of CBL is the tendency for some students to memorize patterns of cases they encounter. Once they encounter the same pattern of history and clinical signs they immediately conclude that this is the same case they had studied before. This tendency of **pattern-forming** must be discouraged and the instructor must emphasize that each case is unique and must be considered different in order to really cultivate critical thinking and analysis.

At first we also considered the **Self-Administered Quiz/Test (SAQ/T)** This method has advantages particularly in terms of cost-effectiveness because it does not need a staff to supervise the students. The students can take the exam at their own time and pace. However, since the students can take the exam anytime they want, check on their scores and repeat the exam to improve their scores it becomes robotic. Some students will try to get the correct answers, memorize them just like a robot and use these memorized answers in actual written exams. The purpose of improving their skills in critical thinking and analysis is defeated.

The use of electronic digital information through the internet or website is indeed very effective. One disadvantage of this system is the inherent cost to develop this system. This is not a problem with rich industrialized nations but a big problem with poor and developing countries. One cost-effective method

I suggest is to make multiple copies of interesting and classical cases of veterinary pathology (gross lesions, histopath lesions, actual necropsy cases, etc.) in cheap easily available CD format that can easily be distributed to our less fortunate Asian neighbors. In this manner even with the absence of internet system in those countries they can catch up with the ever-expanding globalization and be abreast with the latest developments in veterinary pathology. The ones that will be benefited by this system will not only be the academic sectors and students but also those graduate veterinarians which also need to update their knowledge in pathology and animal diseases.

For a final comment I always say to my students" the tool is only as good as the skill of the one using the tool". No matter how sophisticated and hi-tech the hardware and equipment you use for teaching they all become useless if the skill of the one using them is low and poor.

[Session III] #13

Round Cell Variant of Myxoid Liposarcoma in a Japanese Macaque (*Macaca fuscata*)

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Five-year-old, female Japanese Macaque (*Macaca fuscata)* was diagnosed with round cell variant of myxoid liposarcoma. At necropsy, multifocal to coalescing, reddish tan to white nodules, ranging from 0.5 to 1cm in diameter, were noted throughout omentum and retroperitoneum. Similar neoplastic nodules were also present in diaphragm, abdominal wall, and on hepatic capsule. Microscopically, neoplastic masses consisted of round to polyhedral cells arranged in cellular sheets with little fibrous stroma. Tumor cells had round, often eccentric nuclei and abundant eosinophilic granular and microvacuolated cytoplasm; Oil red O staining demonstrated large numbers of small lipid droplets in cytoplasm. Ultrastructurally, tumor cell cytoplasm was packed with occasional lipid vacuoles and numerous enlarged mitochondria. Immunohistochemistry revealed tumor cells were positive for vimentin, while negative to cytokeratin (AE1/AE3), smooth muscle actin, skeletal muscle actin, and Factor VIII-related antigen. To authors' knowledge, this is the first report of round cell variant of myxoid liposarcoma in nonhuman primate.

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