

Editorial

Recent strategies in pathology focus on our understanding of molecular basics of human development and diseases. Most colleagues (and specialists too) assume that the knowledge of stored biomedical information as it might be seen in DNA and genes will give us univocal answers to important medical questions such as the relationship between primary and secondary tumors, the chance to prevent the outbreak of or even to cure certain diseases such as diabetes, cystic pancreatic fibrosis or breast cancer. The birth of these investigations started with the application of antibodies and related probes such as labeled endogenous lectins or immobilized carbohydrates which became an unrenounceable tool in the daily work of a diagnostic pathologist.

At about the same time the development of electronic communication in pathology took place. This technology which is nowadays known under the term telepathology has made an even more impressive development although its application in pathology is by far not that frequent.

In the USA, the roots of telepathology rank back about 25 years. Interestingly, the first trials started when the image acquisition and display techniques were still not adequate for diagnostic image interpretation an ordinary pathologist is used to. In the USA, these trials were directly related to immediately assist a histological diagnosis or replace a pathologist in the hospital of the surgical theater, a technique which is today summarized under the term on-line or interactive telepathology.

In Europe, the development of telepathology was different. First of all, it started about 10 years later. The break through date can be associated with the First European Conference on Telepathology, which took place in Heidelberg in June 1992. The most relevant presentations were published in a special issue on telepathology in the journal *Zentralblatt für Pathologie*, and are still cited today. Secondly, besides the reports on interactive telepathology, especially from the colleagues working in Tromsø, Norway (T. Eide and I. Nordrum) experiences with an additional compartment of telepathology were discussed intensively, a technique which is known as passive or off-line telepathology and mainly used for expert consultations in our days. In those days, most pathologists were unaware of the meaning of telepathology, and numerous

colleagues confused the term “telepathology” with the term “telepathy”. This, of course, is history, and there is nearly no national or international conference on pathology without a specific session on telepathology. In addition, several conferences directly related to various aspects of telecommunication have occurred and will take place in the future.

This special issue of *Analytical Cellular Pathology* discusses the state of the art of telepathology seen through the eyes of European specialists. The reader will notice that investigations on social parameters of this technique, on expansion to educate or train students or on quality assurance are in the focus of interest. The accuracy of telepathology under specific circumstances such as frozen section service or expert consultation, the technical prerequisites, and the potential error rates are known and have been investigated by several teams.

One major problem in the past was the establishment and implementation of technical and medical standards which should permit the collaborative work of different users. The development of the Internet and its use for telepathology purposes has turned out to solve numerous problems associated with standards and communication connections. High resolution image acquisition and presentation are available. Problems of handling of large data files are technically nearly completely solved. However, it remains the fact that the daily use of telepathology is still restricted to a few big-sized institutes of pathology, and some smaller ones with “enthusiastic” colleagues.

The reasons for a certain “self-limitation” of telepathology are complex, and probably related to specific applications. On-line telepathology application has its promoters and constraints mainly in local conditions. The relationship between the surgeon and the pathologist, the financing, the state of competition may be named. Off-line telepathology or expert consultation is closely related to the information content of the submitted images. Those diseases which can be definitely diagnosed by a “yes–no” molecular-biological technique (for example, the immune histochemical visualization of antigens in malignant lymphomas) do not “fit” into the scope of telepathology. The performance of any immune histochemistry can not be applied to

electronic images, and the definite diagnosis does not depend upon the difficult interpretation of a conventionally stained slide.

When reading this issue, the reader will notice that telepathology has left its childhood, and is on the way to find its place in the world of diagnostic pathology. By doing this, it will probably change the environ-

ment of diagnostic pathology, hopefully to the benefit of our patients.

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