

## PRESENT CHANGES IN TELEPATHOLOGY AND TELEEDUCATION: TOMORROW, WHAT DO WE HAVE TO EXPECT ?

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At present, telepathology can still be divided into on-line and off-line telepathology. It is characterized by technical solutions, which have been developed during the last decade. On-line telepathology uses fixed partners and closed systems, mainly based upon ISDN lines. It usually connects small surgical units with a large institution of pathology. In addition to the quite expensive systems one-line telepathology requires a continuous education and training of technicians and personal trust between the pathologist and clinical partners. From the medical viewpoint only those surgical institutions are potential telepathology partners which are located in small to medium sized hospitals, i.e., which operate on frequent and technically "easy-to-handle" diseases, such as breast disorders. In accordance with these prerequisites, most of the published on-line telepathology studies report on breast, gall bladder, and similar diseases. The diagnostic specificity and sensitivity is without any doubt comparable to the conventional frozen section service. The technical off-line telepathology solutions (expert consultation systems) balance between diagnostic responsibility of the involved expert and open access to the consultation center. The most restrictive center is that of the American Forces Institute of Pathology (AFIP) in Washington, DC, USA. It can offer complete responsibility for the experts' diagnoses, as all involved experts work in the AFIP. The UICC-TPCC (Telepathology Consultation Center of the Union International contre le Cancer, Humboldt University, Berlin, Germany) does not take legal responsibility for experts' diagnoses, as the involved experts work in world-wide located institutions. The lowest responsibility is offered by the iPATH consultation system, located at the Institute of Pathology, University Basel, Switzerland, as this system is open for experts and clients. Clients can create their own expert teams and organize their consultations in any way they like. Both on-line and off-line telepathology systems promote further digitalisation in pathology. The final aim is the implementation of a virtual telepathology institution, which requires fully digitalized images and specialized workflows. These systems will take influence on education and training in pathology, as specific cases and rare diagnoses can be retrieved without difficulties in the corresponding image data bases. In addition to the development of pathology towards a pure electronic diagnostic procedure, electronic education in pathology is leaving its childhood too. Several universities offer educational programs and digitised images for their own students and those from other institutions. Looking to other research disciplines such as physics or chemistry,

which are more advanced in teleeducation (for example, lectures offered by the Massachusetts Institute of Technology, MIT) electronic training in pathology will probably follow its own specific conditions. At present, several teleeducation systems in pathology are offered on CDs. Within these, a "lung pathology CD" has been developed, which includes about 60 common and rare lung diseases. Information on all aspects of these diseases is given including live images, epidemiology data, and on-line access to the PUBMED library. The CD can be used simultaneously as textbook or training system. The combination of teleeducation systems with teleconsultation centers will increase the responsibility levels of consultation, and will open new ways for training and education in diagnostic pathology.