

The public cadaver

Anatomy: displays of bodies are no longer sufficient to explain the richness of modern anatomy to students or to the public.

Horst-Werner Korf and Helmut Wicht

Knowledge of anatomy underpins contemporary medicine, and is indispensable for understanding the structural and biological nature of humans. Dissection is used to analyse the body, and provide insights into its structure, function and dysfunction. Anatomists have to communicate their results to medical doctors and students — and to all those who are interested in their own body.

Anatomists have always had to walk the thin line between scientific objectivity and public spectacle. The first recorded dissections of human bodies, performed by Herophilus around 300 BC, were public, as were the few dissections carried out during the Middle Ages. In the seventeenth and eighteenth centuries, anatomical theatres were founded in many European cities. The dissections held in these theatres served partly to educate medical practitioners and students, but were also public spectacles of little educational value. In the nineteenth century, the rising numbers of students, the increasing amount of data, the intricacy and delicacy of the preparations, and finally, the use of microscopy requiring sophisticated histological equipment, forced anatomy to retreat into the well-equipped laboratories, dissection halls and lecture theatres of universities.

Modern anatomy consists not only of macroscopic examination of the body, but also views cells and molecules as essential players in any physiological or pathological process. It is no longer restricted to the static and descriptive levels, but has evolved into 'living anatomy'. Our anatomical knowledge has expanded tremendously, and today covers not only the spatial dimension of a dead body or cell, but also the temporal and dynamic dimensions underlying all living processes. For example, anatomical investigations of the circadian, rhythm-generating systems have located the internal clock in the hypothalamic suprachiasmatic nuclei, identified the neuronal pathway that serves the entrainment of the endogenous rhythm with the day–night rhythm, discovered photoreceptors in the retina responsible for this entrainment, and reached down to the level of the rhythmically expressed genes that make the clock tick. As a welcome side effect, anatomy remains one of the few medical disciplines that deals with the humans holistically.

Anatomy has come a long way from the 'show and tell' anatomy that could be taught



A closer look: but in autopsies today, dissection is only the start.

to a paying audience in an anatomical theatre within a few hours. Today, anatomy still requires the dissection of a human body and the display and naming of all its visible parts. But this macroscopic view is only the first part of the anatomical curriculum which embraces a 'vertical' holistic approach — from the macroscopical level (including self-examinations and demonstrations on living subjects) to the molecular (laboratory courses in molecular biology), from the spatial dimension (topographic anatomy) to the temporal (embryology, gerontology and evolutionary anatomy). This conceptual integration is central to the understanding and teaching of modern anatomy.

Those teaching anatomy, as for any other subject, need to capture the attention and interest of their pupils, but the engagement of an audience has to serve a genuine task — the transmission of knowledge. That is difficult enough with medical students, but the public also wants and needs to be informed about their bodies. Didactic principles cannot simply be borrowed from the spectacular anatomy of the old days — anatomy should be thrilling, but it should not offer cheap thrills. It is certainly not sufficient to display the macroscopy of the cadaver in public, to erect a cabinet of curiosities, to expand and explode and to plunder the history of art and anatomy, as Gunther von Hagens does in his *Body Worlds* shows. To demonstrate contemporary scientific anatomy to the public, it is necessary to combine contemporary concepts and cadavers, as the former are needed to understand the latter. This is a formidable task and requires sophisticated didactic methods and a commitment

from both teachers and the public that reaches beyond a brief visit to an exhibition.

Anatomy also has to respect a strict ethical code. Anatomical dissections occur within a diffuse and continuous transition zone between man and material. At the start there is the body of what was a self-determined living subject, and in the end, a dissected anatomical preparation, an object that can be used to obtain anatomical knowledge. But even though the integrity of a body is destroyed after death, the dignity of the person remains — thus both their corpse and their wishes deserve respect. Anatomical dissections or the removal of organs for scientific purposes should only be performed with the written consent of the donors. Sadly, this rule has been violated in the past and present. A recent example is the alleged sale of body parts donated to the Medical School of the University of California, Los Angeles (see *Nature* 428, 243; 2004).

These problems underpin the necessity for non-commercial, professionally supervised 'willed body programmes' with high transparency. For example, our anatomy school will not accept any dead body unless the deceased gave prior written consent. In turn, we treat the corpse with due respect: we use the cadaver only for scientific and educational purposes and we provide a decent funeral of the donor's remains if this is his or her wish.

We need anatomy, but on the basis of contemporary concepts, methods, didactics and ethics. Medicine needs anatomy. The public needs anatomy. Anatomy needs the public, as an audience and as a donor. What we need least is the public cadaver exposed in shows of little scientific and educational value. ■

Horst-Werner Korf and Helmut Wicht are in the *Senckenbergische Anatomie, Medical Faculty of the Johann Wolfgang Goethe-University, Frankfurt/Main, Theodor-Stern-Kai 7, Frankfurt D-60590, Germany.*

Horst-Werner Korf and Helmut Wicht are in the *Senckenbergische Anatomie, Medical Faculty of the Johann Wolfgang Goethe-University, Frankfurt/Main, Theodor-Stern-Kai 7, Frankfurt D-60590, Germany.*

FURTHER READING

Haeser, H. *Lehrbuch der Geschichte der Medizin* Vol. 1. (Friedrich Mauke, Jena, 1853).

Korf, H.-W. & Stehle, J. H. (eds.) *Cell Tissue Res.* 309, 1–199 (2002).

Stukenbrock, K. *“Der zerstückte Körper”. Zur Sozialgeschichte der anatomischen Sektionen in der frühen Neuzeit (1650–1800)* (Steiner, Stuttgart, 2001).

Yamaguchi, S. et al. *Nature* 409, 684 (2001).