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Dermatopathology comes to life!

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Dermatopathology comes to life!

Dermatopathology has lost its momentum in science. Nowadays it is mainly a diagnostic aid but has little impact on the way we generate concepts about a disease. In the old days many innovative concepts that advanced dermatology in particular and medicine in general started by observing a piece of tissue by light microscopy. The optical microscope was a central instrument to medicine like Galileo's telescope was to astronomy. Galileo's telescope revealed unexpected phenomena that challenged traditional geocentric astronomy, and light microscopy challenged traditional views of biology and medicine. Those days are over and will never come back.

When we think about innovation in medical science today we think about molecular biology and experimental medicine. It is hoped that, one day, molecular biology will reveal the hidden code of life in a way that every biologic state, physiologic or pathologic, becomes predictable. These hopes are similar to the deterministic view of physicists in the 19th century who thought that for everything that happens there are conditions such that, given them, nothing else could happen. This deterministic view was heavily influenced by the enormous success of Newtonian physics. Today it is generally accepted that this view was too optimistic. It seems that the world we live in is undetermined. What we call "law of nature" seems to express the limits of what might happen but does not determine what exactly will happen under certain conditions. If we are unable to predict exactly what will happen, we can only observe it in real life or simulate it in an experiment. An experiment is simply a specific type of observation under controlled conditions. According to Karl Popper, the main role of experiment and observation in science is not to prove but to disprove ("falsify") concepts. However, there is no justification for the belief that performing experiments is more "scientific" or "better" science than performing direct observations. Who needs a Foucault pendulum (a typical experiment) to demonstrate the rotation of the earth if it can be observed directly by an astronaut in a space capsule?

What does this all have to do with dermatology and dermatopathology?

Dermatopathology is mainly an observational and not an experimental discipline. Every new and unexpected observation may, in the same way as experimental data, enrich our knowledge by important details, which are not consistent with previous interpretations of phenomena. An accumulation of such inconsistencies usually leads to scientific crisis that is finally resolved by a novel conceptual framework or paradigm that replaces the old one. This is how science progresses. Paradigm shifts are often accompanied by novel technical developments that change our point of view. The good news is that such novel technical developments are about to revive our discipline's impact on science. The recent developments in vivo microscopy imaging techniques, such as confocal laser scanning microscopy, optical coherence tomography, multiphoton microscopy, or optical sonography have the potential to bring dermatopathology back to life. The study by Skvara et al [1] in this issue of *Dermatology Practical and Conceptual* is a good example of how in vivo imaging techniques are about to change our point of view. They combined in vivo reflectance with fluorescence confocal microscopy and provided exciting insights on human skin in vivo. It would be completely wrong to think that the major purpose of such a device is the diagnosis of skin diseases.

These modern devices are equivalent to Galileo's telescope of the 17th century, and it is only a matter of time until in vivo microscopy imaging devices will reveal unexpected phenomena that will challenge traditional views of dermatology and dermatopathology.

Traditionally dermatopathologists examine a dead piece of tissue under the microscope, but at some point in time one has to break with one's tradition or one becomes extinct. Although unrecognized by those who think that "real" science is restricted solely to experimental medicine and molecular biology, the molecular revolution is not the only revolution going on in medicine. In vivo microscopy imaging techniques are about to change medicine practically and conceptually. From a conceptual point of view these techniques will enable us for the first time to observe the evolution of skin diseases in vivo on a microscopic level. From a practical point of view they will help us to target therapeutics more efficiently. Dermatopathologists are most competent to examine a piece of skin through a microscope, whether ex vivo or in vivo. They only have to change their point of view from static to dynamic. By means of in vivo techniques dermatopathology has the potential to regain momentum in science and to become essential with regard to modern individualized therapy; an opportunity that should not be missed.

Reference

1. Skvara H, Plut U, Schmid JA, Jonak C. Combining in vivo reflectance with fluorescence confocal microscopy provides additive information on skin morphology. Dermatol Pract Conc. 2012;2(1):2. http://dx.doi.org/10.5826/dpc.0201a02.