

Transcending borders—integrating cell biology in the new Protoplasma

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Beginning with this issue, Protoplasma will return to its roots: Reimer Stick (University of Bremen), who has been a Protoplasma board member for decades, will from now on as second editor-in chief preside over the domains of animal and medical cell biology. Now supported by the two columns of ‘green’ and ‘red’ cell biology, the journal is reviving a tradition that gave good reason to have it named Protoplasma. When the journal was founded back in 1926, this was a generally accepted synthesis at that time, with a plant (Josef Spek) and an animal (Friedl Weber) cell biologist installed as editors-in-chiefs with the explicit goal (Spek and Weber 1926): ‘Durch die gegenseitige Anregung der einzelnen Disziplinen neue Blickpunkte zu gewinnen, neue Arbeitsmöglichkeiten zu schaffen’ (to gain insights into new viewpoints and to create novel fields of work through mutual stimulation of the individual disciplines).

The life sciences are traditionally shaped by their objects of studies—the communities of bacterial, fungal, plant, and animal scientists tend to discuss among themselves and often publish in their own organism-specific journals. This is of course convenient, because one can spare the effort to explain concepts that are familiar to every member of the one community but not to other communities. However, a short historical look shows that many fundamental advances in biology have always stemmed from interdisciplinary work. The discovery that all life forms are governed by the same molecular principles gives cell

biology a unifying framework. Actually, the cell theory, first formulated by the botanist Matthias Jakob Schleiden (1838), emerged as the fruit of intensive debates between Schleiden and his close friend, the animal physiologist Theodor Schwann. The idea that all life forms, as different as they might appear at first glance, are composed of cells, not only helped to integrate biology but also stimulated the first joint research programme: If it is true that cells embody the full functional potential of life, it should be possible to regenerate entire organisms from single cells. The experimental proof of this prediction in fact stimulated more than a century of exciting science, where sometimes ‘red’, sometimes ‘green’ cell biology was in the lead, but always remained in close dialogue with the other side. Thus, the first culture of animal cells was established by Ross Granville Harrison in 1907, preceding the first plant cell culture by almost three decades. Conversely, the plant side was first in regenerating an entire organism from a single cell, enabled by the new discovery of phytohormones (Vasil and Hildebrandt 1965). Again, it required a new technology: induced pluripotent stem cells, to demonstrate the developmental predictions derived from cell theory also for animal cells (Takahashi and Yamanaka 2006).

The seemingly old-fashioned title of this journal already expresses the unity of ‘green’ and ‘red’ biology. The term *protoplasma* was coined independently by the medical physiologist Jan Evangelista Purkyně (to describe the substance inside of blood cells as opposed to the soluble *plasma*) and the plant physiologist Hugo von Mohl, who used this term to describe the ‘turbid, viscous, particle containing liquid’ in the interior of plant cells. It was also Purkyně, by the way, who stressed that we need to understand the structure of cells in order to understand their biological function—a thought that was revolutionary at that time: as recalled vividly in a Protoplasma review on his work and life (Žarský 2012): Interestingly, this great forefather of functional cell biology

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had been fighting over years for a state-of-the-art microscope with a stubborn faculty at the University of Breslau that just could not understand, ‘for what (purpose) a physiologist could possibly need a microscope...’ (Žarský 2012).

That structure has to be seen in the context of function is universally accepted these days. However, the search for crucial molecules has sometimes obscured our view on the structural prerequisites for dynamic processes. Cell biology, after all, is also a science of images. Careful documentation of microscopy has always been and always will remain a central topic in the policy of the journal: ‘To publish’ means to ‘put to discussion’ and this means that microscopical images should not be shrunken to postage stamp size. Concepts can change, data should not. Therefore, high-quality representation of images is a must for any cell biological journal.

Our front cover, from the July issue (Anan’ina et al. 2014), depicting an egg chamber of a fly, not only illustrates that ‘green’ and ‘red’ fit together very nicely but also stands for the values held up by this journal: quality of illustration, connecting

structure with function, and crossing the borders of disciplines towards integrative cell biology.

References

- Anan’ina T, Kokhanenko A, Stegny V (2014) Cyst geometry in the egg chambers of *Calliphora erythrocephala* Mg. (Diptera: Calliphoridae) ovaries. *Protoplasma* 251:913–919
- Harrison RG (1907) Observations on the living developing nerve fiber. *Proc Soc Exp Biol Med* 4:140–143
- Schleiden MJ (1838) Beiträge zur phyto-genesis. *Arch Anat Physiol Wiss Med* 13:137–176
- Spek J, Weber F (1926) Vorwort. *Protoplasma* 1:I–III
- Takahashi K, Yamanaka S (2006) Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. *Cell* 126:663–676
- Vasil V, Hildebrandt AC (1965) Differentiation of tobacco plants from single isolated cells in microcultures. *Science* 150:889–890
- Žarský V (2012) Jan Evangelista Purkyně/Purkynje (1787–1869) and the establishment of cellular physiology—Wrocław/Breslau as a central European cradle for a new science. *Protoplasma* 249:1173–1179