

==== ORAL PRESENTATION ABSTRACTS ====

**Current aspects and perspectives of Aquaporinology: 30 years after the discovery in Cluj-Napoca by Benga group of the first water channel protein (later called aquaporin1)**

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In 1985, together with my coworkers, I discovered in Cluj-Napoca, Romania, the first water channel protein (WCP) in the human red blood cell (hRBC) membrane, after a decade of systematic studies of water diffusion in the hRBC. The discovery was reported in 1986 in two landmark publications (Benga *et al.*, 1986a,b) and reviewed in subsequent years (Benga, 1988; 1989).

In 1988 the same protein was serendipitously isolated from hRBC by Peter Agre and coworkers working in Baltimore, USA, and called CHIP28 (*CH*annel forming *I*ntegral membrane *P*rotein of 28 kDa) (Denker *et al.*, 1988). This group recognized the role of the protein as a water channel only in 1992 (Preston *et al.*, 1992). In the same year other WCPs were discovered and cloned and the name “aquaporins” was proposed for this class of membrane proteins. The WCP first discovered by my group in 1985 and re-discovered by Agre group in 1992 was called aquaporin 1 (AQP1). Soon it became obvious that a large family of WCPs exists, as hundreds of such proteins have been discovered in organisms from all kingdoms of life, including unicellular organisms (archaea, bacteria, yeasts, and protozoa) and multicellular ones (plants, animals, and humans). WCPs belong to a superfamily of membrane proteins called MIPs (intrinsic membrane proteins) (Benga, 2012)."

In 2003, Peter Agre was awarded the Nobel Prize in Chemistry "for the discovery of water channels". An invited review of the history of the discovery of water channels proteins was published by Benga in September 2003, one month before the Nobel Prize for Chemistry was announced (Benga, 2003). The seminal contributions from 1985 of the Benga group were completely overlooked by the Nobel Prize Committee.

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The discovery of WCPs was a crucial event in science. As formulated by Wolburg *et al.* (2011): “The detection of water-specific membrane channels in red blood cells belongs to the fundamental discoveries in biology of the twentieth century (Benga *et al.*, 1986a,b; Denker *et al.*, 1988; Preston *et al.*, 1992).” As I have been working in the field for more than 25 years I could see that this domain of science became a very hot area of research embracing many branches of natural sciences, These proteins are now studied from the molecular and cellular level (structure-function relationships, expression in various cells, regulation) to the level of whole organisms and of populations. New very important aspects are uncovered every day, the diversity of hundreds of WCPs is revealed, with increasing practical implications, including the physiological and medical implications. Thousands of publications appeared on these topics. The study of water channel proteins became not only a very hot field of research with a lot of theoretical and practical issues, but also a new domain of natural sciences, domain for which I suggested the term of “aquaporinology” (Benga, 2013, 2014).

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