

EDITORIAL

Fusion Pore: A Curious Case of Rediscovering Science

Nodar P. Mitagvaria*

I. Beritashvili Center of Experimental Biomedicine, 14 Gotua Street, 0160 Tbilisi, Georgia;

*Corresponding author:

Nodar P. Mitagvaria, PhD, ScD, Professor and Head, Department of Cerebral Circulation & Metabolism, I. Beritashvili Center of Experimental Biomedicine, 14 Gotua Street, 0162 Tbilisi, Georgia; E-mails: nodmit@gmail.com and secretary@lifescience.org.ge

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In pioneering studies, the group of James E. Rothman discovered that target membrane proteins called t-SNAREs and vesicle-associated membrane proteins called v-SNAREs are the minimal fusion machinery involved in cells. In a recent review¹ entitled: “*Fusion pores* and their control of neurotransmitter and hormone release”, the authors present in Figure 2 a model of the t-/v-SNARE rosette or ring complex, completely ignoring earlier studies hypothesizing this model² (see Figure 5) and the actual experimental confirmation of the model³⁻⁵ (Figure 2C³; Figure 2⁴ and Figure 2⁵) nearly two decades ago. This is how science reinvents itself and pioneering contributions are knowingly ignored, hoping that the rest of the scientific community will remain ignorant of earlier findings and discoveries. In 1998, the group of James E. Rothman published in the journal *Cell* including on the cover, an elegant model of the sagittal section of a t-SNARE and v-SNARE mediated secretory vesicle docked at the target membrane, demonstrating the rosette or ring confirmation of the assembly of the t-/v-SNARE complex² (Figure 5). This elegant assembly of the SNARE complex in a rosette published by James E. Rothman has been experimentally demonstrated using both atomic force microscopy³⁻⁵ and electron microscopy⁶, by Bhanu P. Jena and his research team. The SNARE complexed as a rosette or ring has also been hypothesized and modeled by many

groups, including the late Ilan Hammel⁷. Curiously, in the recent *J. Gen. Physiol.* 2017 Vol. 149 No. 3 301–322 review article¹, there is no discussion, mention, or reference of any kind to these earlier published findings.

Similarly, in the past 20 years following discovery of the supramolecular secretory machinery in cells, the “*porosome*”^{8,9}, there has been a flood of papers on new protein being identified to associate with t-SNAREs at the so called “fusion protein complex” or the “fusion active zone” at the cell plasma membrane¹⁰, completely ignoring the actual *porosome* structure at the cell plasma membrane where secretory vesicles transiently dock and fuse to release a fraction of their contents in a highly regulated manner, as opposed to an all-or-none mechanism of complete vesicle merger at the cell plasma membrane. Seeing is believing, and the physical existence of the *porosome* using atomic force microscopy, and confirmed by electron microscopy and X-Ray solution imaging is undeniable. Scores of studies continue to be reported on the role of various *porosome* proteins on cell secretion and their altered states resulting in secretory defects – *a tale of rediscovering science*.

Keywords: Fusion Pore, SNARE ring complex, membrane fusion, Porosome - the secretory machinery;

Conflict of Interest:

The author has no conflicts of interest to declare.

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