

## HABILITATION THESIS REVIEWER'S REPORT

### Masaryk University

**Applicant**

Mgr. Petra Procházková Schruppfová, Ph.D.

**Habilitation thesis**

Functions of Plant Proteins Associated with Telomeric Repeats and Telomerase

**Reviewer**

Prof. RNDr. Ľubomír Tomáška, DrSc.

**Reviewer's home unit, institution**

Department of Genetics, Faculty of Natural Sciences, Comenius University Bratislava, Ilkovičova 6, 842 15 Bratislava, Slovakia

The habilitation thesis of dr. Petra Procházková Schruppfová (further: *the candidate*) is an annotated set of nearly 20 publications, whose common denominator are proteins associated with the ends – telomeres – of nuclear chromosomes in plants. The candidate's work was aimed at identification, characterization, and functional analysis of various types of plant telomere-binding proteins (TBPs), most of which are not dedicated strictly to telomeric functions, but also participate in regulation of gene expression. On most (11/18) relatively well-cited (~300 in WoS) publications the candidate was the first and/or the corresponding author underlining the crucial role she has played in these studies.

The thesis is well written and structured such that it should be comprehensible for a non-specialist in the field of telomere biology. I especially liked the part dedicated to evolution of telomeres, which was in some clades accompanied by diversification of telomeric repeats this posing a selection pressure on TBPs. This was illustrated by several examples of insects and plants, the latter being supported by several studies from the candidate's laboratory (as documented by illustrations adopted from the candidate's review articles). My comments that (1) I missed a more detailed description of a runaway evolution of telomeric repeats and TBPs in ascomycetous yeast and (2) the claims (p. 10) that (i) the (TTAGGG)<sub>n</sub> motif "is the most predominant terminal repeat sequence in fungi..." and (ii) that "yeast telomeric sequence is not regular and can be described as T(G<sub>1-3</sub>)" are not substantiated, may be caused by my professional bias. Also, a somewhat superficial description of non-plant telomeres and inclusion of some inappropriate references (Blackburn and Gall in 1978 did not describe telomerase, Tomáška et al. 2018 is not a review about yeast telomeres) was most likely caused by a limited space that was dedicated to a prelude to the core part of the introduction, i.e. plant telomeres and TBPs.

The main and the most extensive part of the thesis is devoted to plant telomere-associated proteins including those binding to double- (ds) and single-stranded (ss) regions of the telomeres as well as to telomerase and its biogenesis. It represents an up-to-date review of the field highlighting both the complexity of the players involved in protection of telomeres in plants as well as the specific contributions of the candidate's laboratory to this still growing and exciting field.

The final chapter of the introduction is *Conclusions* written in a form of an abstract. In my opinion, at least one paragraph dedicated to the perspectives of the field of plant telomere biology would be helpful to emphasize main questions that remain to be unanswered and the venues that the candidate considers worth pursuing.

The rest of the thesis is represented by a comprehensive list of references and copies of the selected peer-reviewed papers. I appreciate that each paper is introduced by a short statement describing the contribution of the candidate to the corresponding study.

### **Reviewer's questions for the habilitation thesis defence**

1. What is the evolutionary origin of plant-specific TBPs?
2. Are the various types of TBPs (Smh/TRB, TRFL, AID for dsTBPs, OB- and non-OB-fold for ssTBPs) interchangeable between species with similar telomeric repeats?
3. Is the composition of the protein complexes associated with the dsTBPs, that bind to both telomeric loci and interstitial/intrachromosomal regions, the same or does it differ?
4. Is there anything special about telomeres and their maintenance in the extremely long-lived trees? What is known about the telomere-binding proteins in such species?
5. Concerning the last point in the review above, what are currently the main challenges in the field of plant telomere biology?

### **Conclusion**

The habilitation thesis entitled "Functions of Plant Proteins Associated with Telomeric Repeats and Telomerase" by Petra Procházková Schrupfová **fulfils** requirements expected of a habilitation thesis in the field of Genomics and Proteomics.

Date: December 15, 2023

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