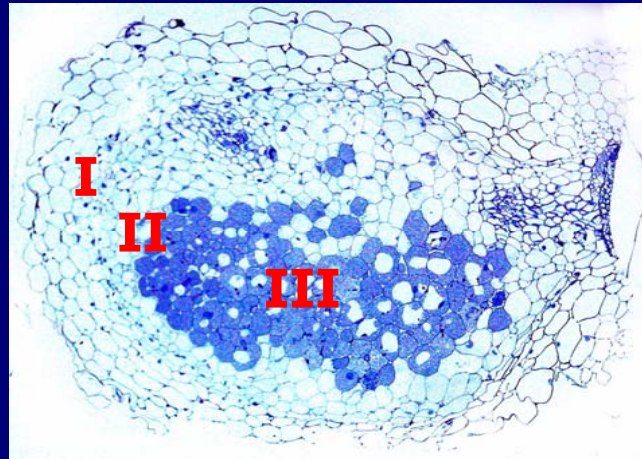
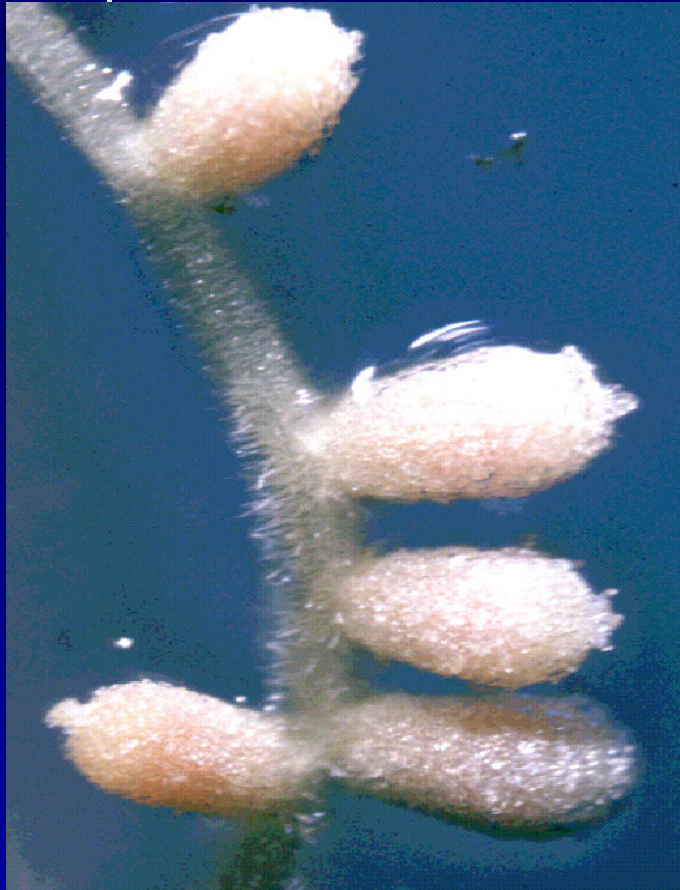


**IMMUNOCYTOCHEMICAL ANALYSIS OF
SPECIFIC MOLECULAR COMPONENTS
ORGANISATION OF EXTRACELLULAR
SYMBIOTIC COMPARTMENTS PROVIDED
INTERACTION BETWEEN SYMBIOTIC
PARTNERS DURING DEVELOPMENT OF ROOT
NODULES OF PEA (*PISUM SATIVUM* L.)**

**EU - Russia: Prospects for Cooperation in Biotechnology in the
Seventh Framework Programme,
Saint-Petersburg, Russia, June 6-8 2006.**

Pea root nodule morphology



I – meristem

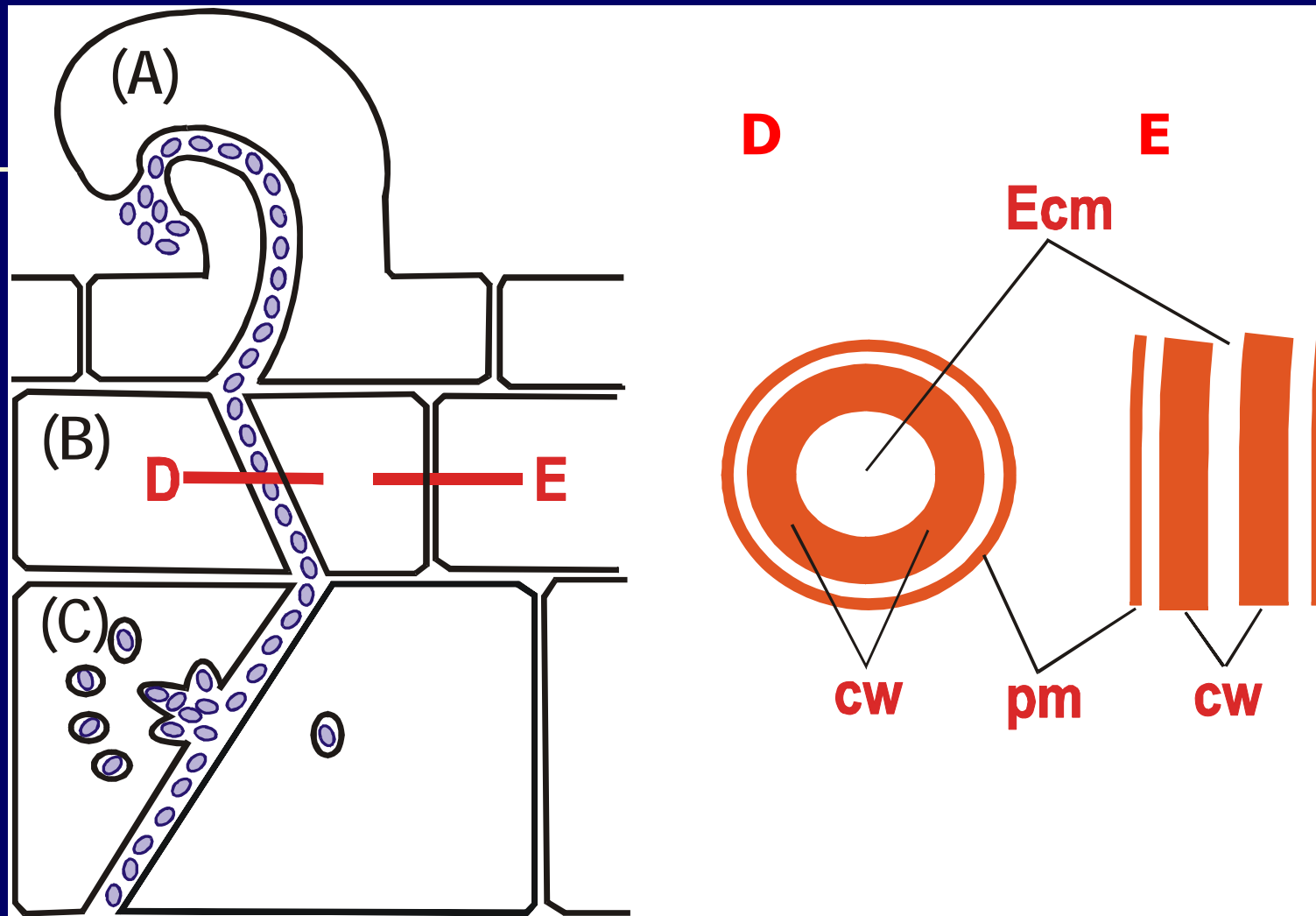
II – infection zone

III – nitrogen-fixing zone

N – nucleus

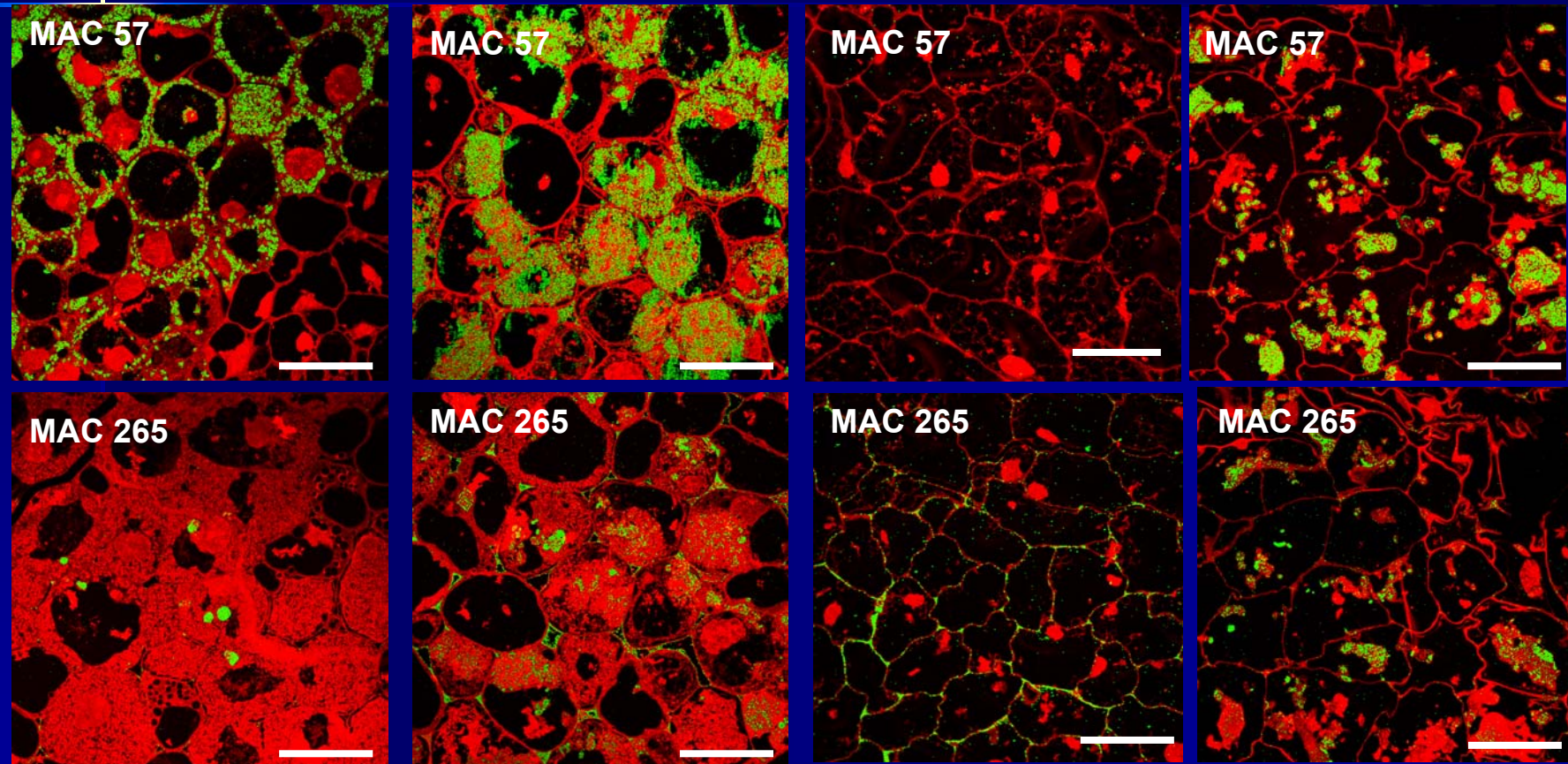
IT – infection threads

Topology of Infection Threads and Symbiosomes



Brewin N.J. Plant cell wall remodelling in the *Rhizobium*-legume symbiosis
Critical Reviews in Plant Sciences 23: 293-316 (2004)

Immunolocalisation of rhizobial lipopolysaccharide (MAC57) and arabinogalactan protein-extensin (MAC265) in single and double pea mutants and *wt* line SGE



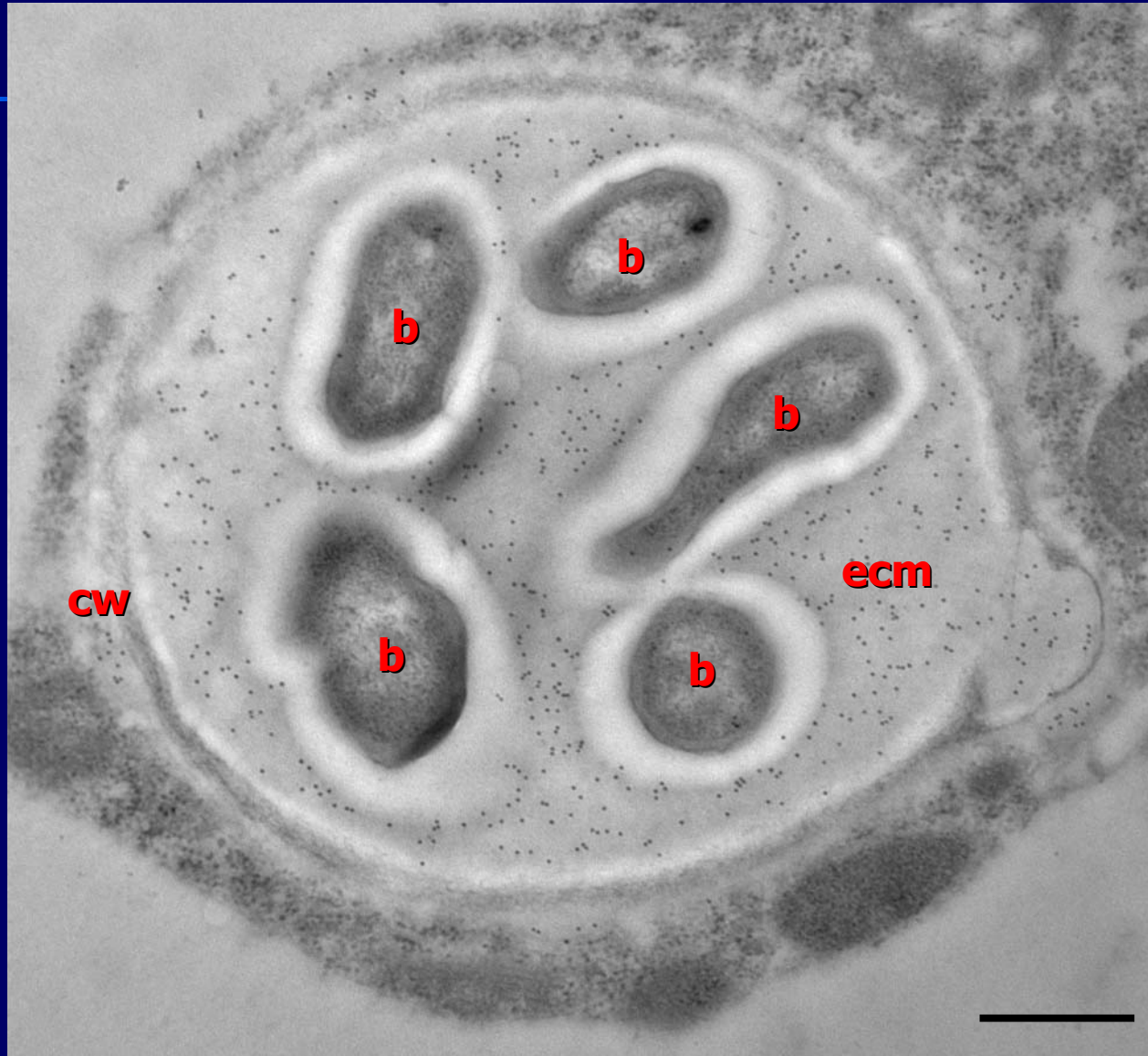
SGE (*wt*)

SGEFix-1 (*sym40*)

SGEFix-2 (*sym33*)

RBT3 (*sym33, sym40*)

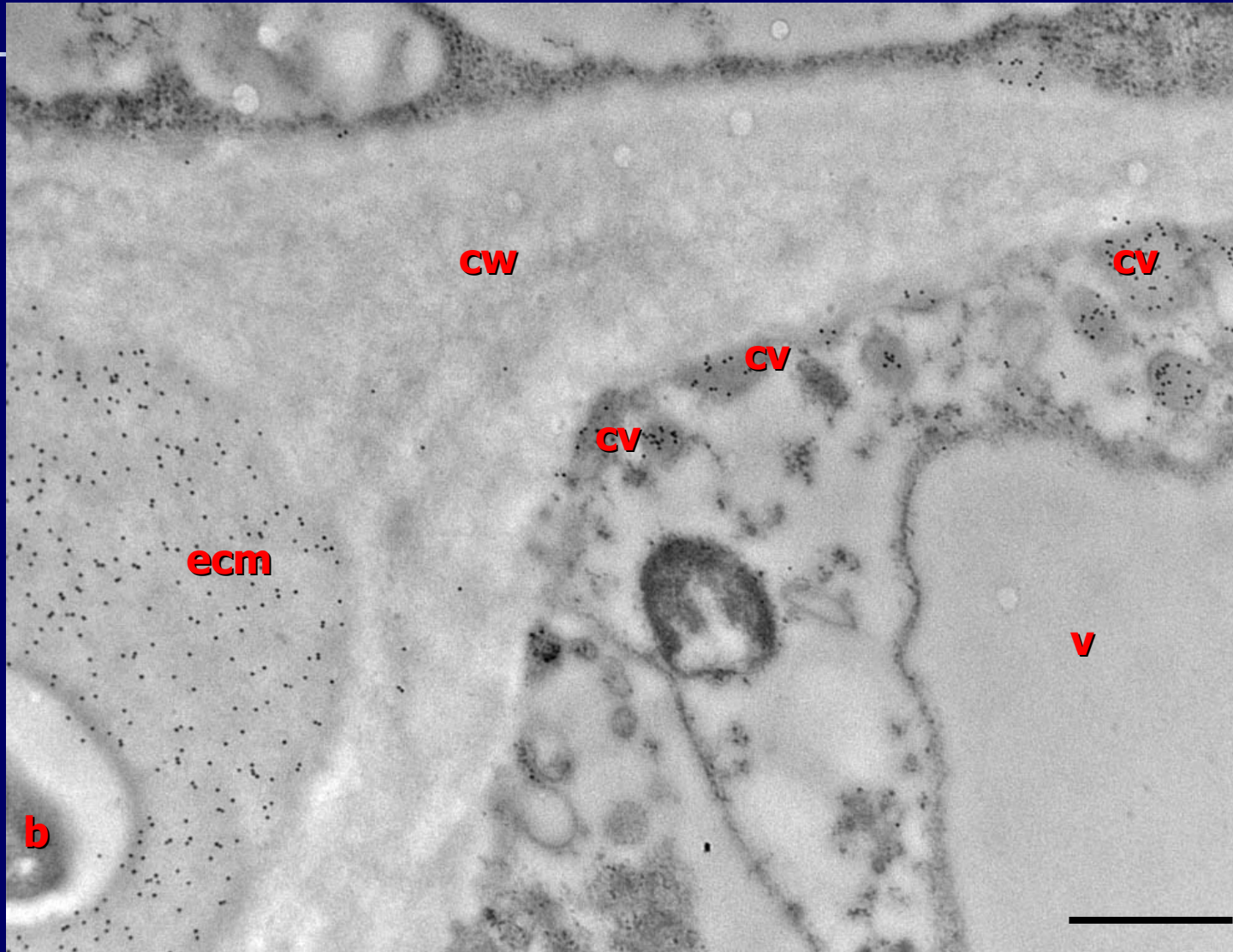
Immunogold localisation of arabinogalactan protein-extensins (MAC265) in a single pea mutant SGEFix-2 (*sym33*) (cw – cell wall, b – bacteria, ecm – extracellular matrix)



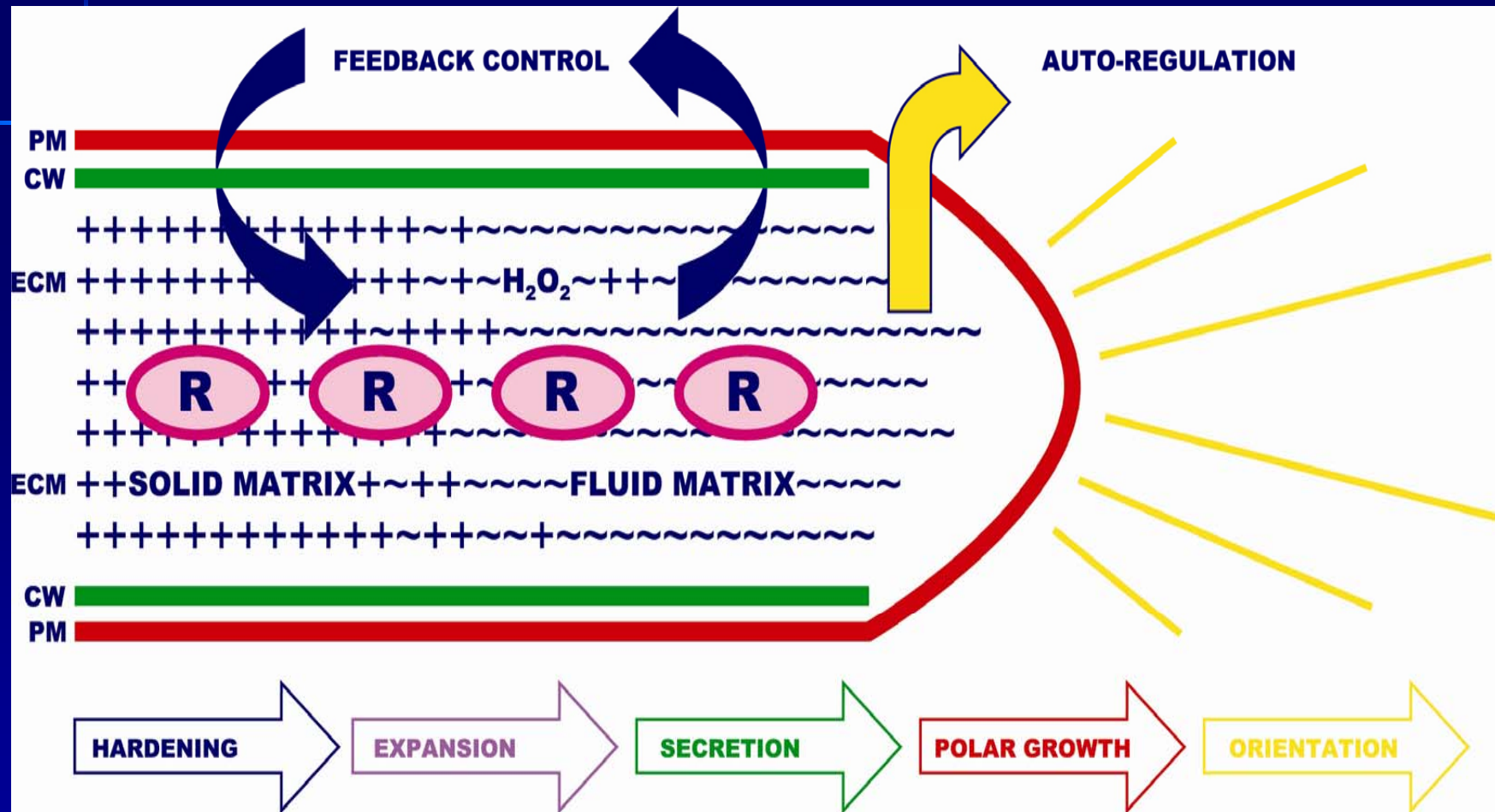
Immunogold localisation of arabinogalactan protein-extensin (MAC265) within intercellular spaces in a single pea mutant SGEFix-1 (*sym40*) (cw – cell wall, is – intercellular space, v - vacuole)



Targetted secretion of the matrix glycoprotein (MAC265) into infection threads of double pea mutant RBT3 (*sym33*, *sym40*) (cw – cell wall, cv – cytoplasmic vesicles, b – bacteria, ecm – extracellular matrix, v - vacuole)

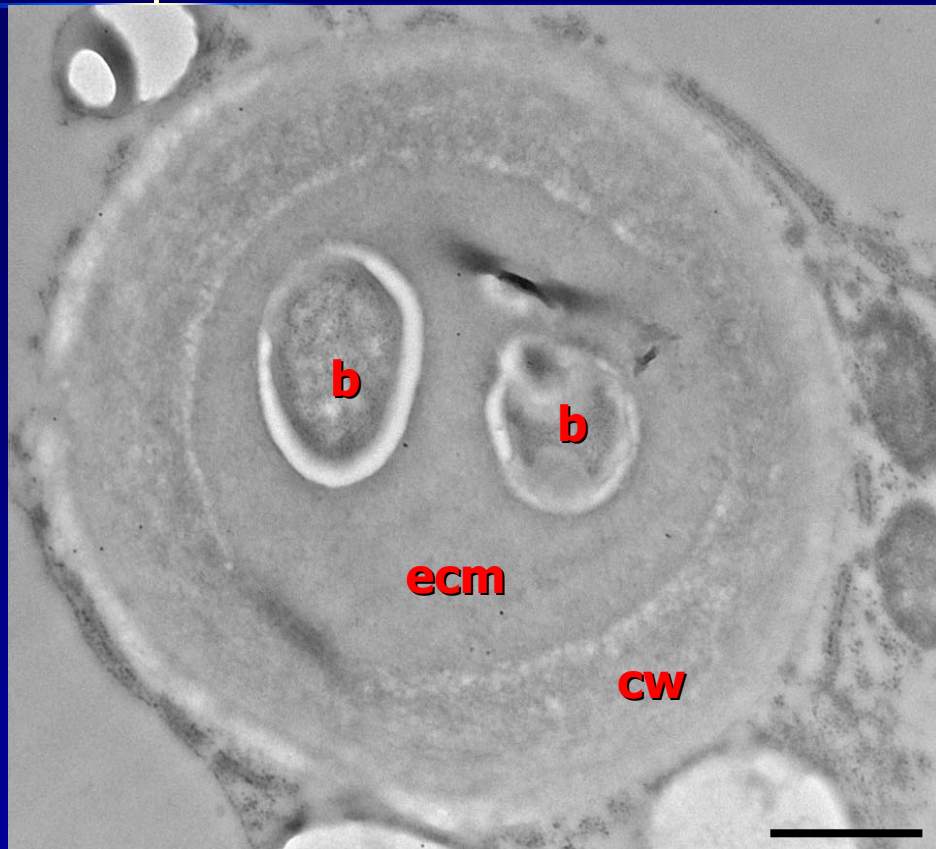


Dynamic model for infection thread growth

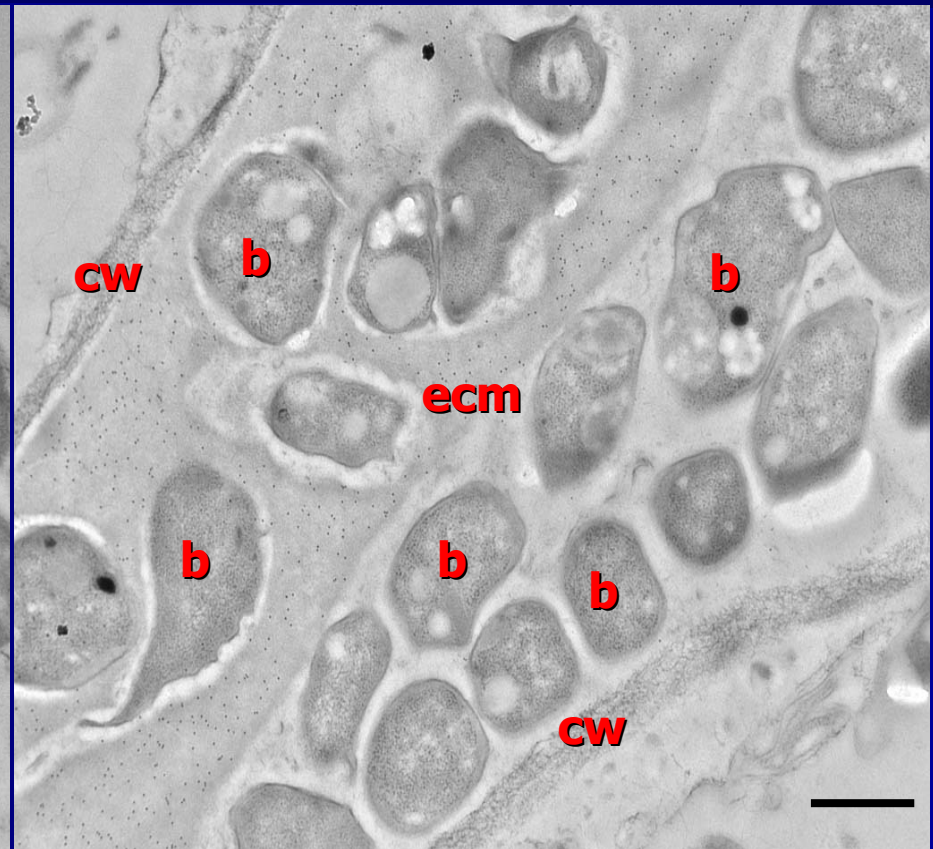


Brewin N.J. Pods and Nods: a new look at symbiotic nitrogen fixing
Biologist 49 (3): 1-5 (2002)

Absence of arabinogalactan protein-extensin (MAC265) label in some infection threads of single and double pea mutants (cw** – cell wall, **ecm** – extracellular matrix, **b** – bacteria)**

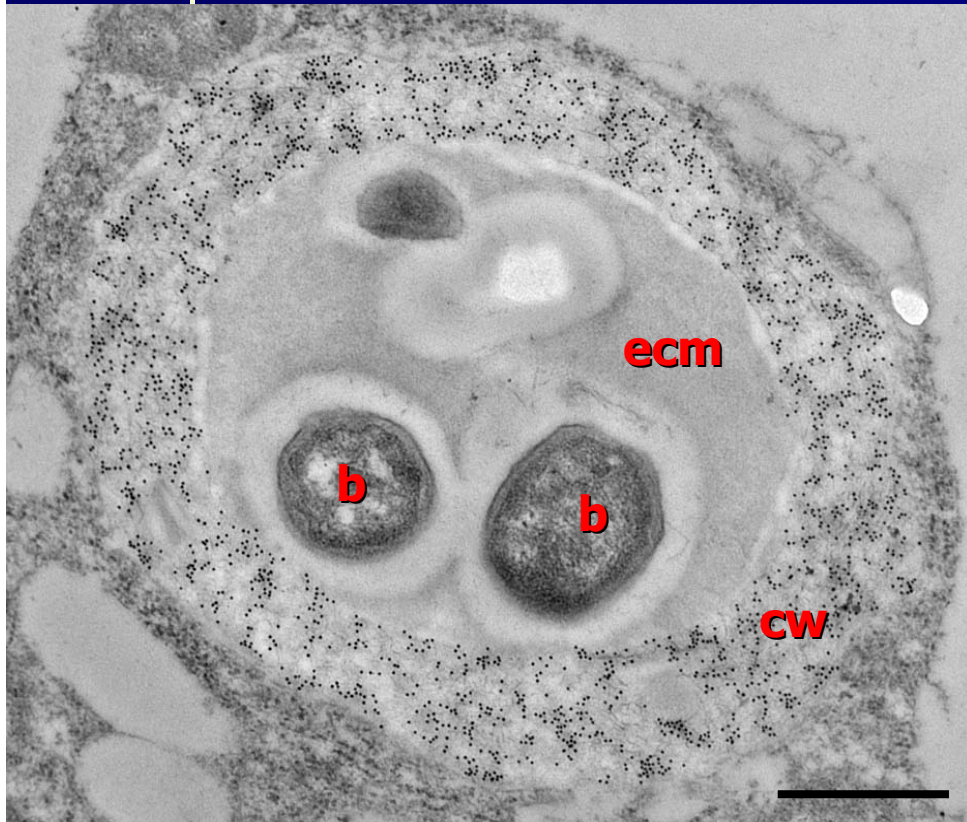


RBT3 (*sym33, sym40*)

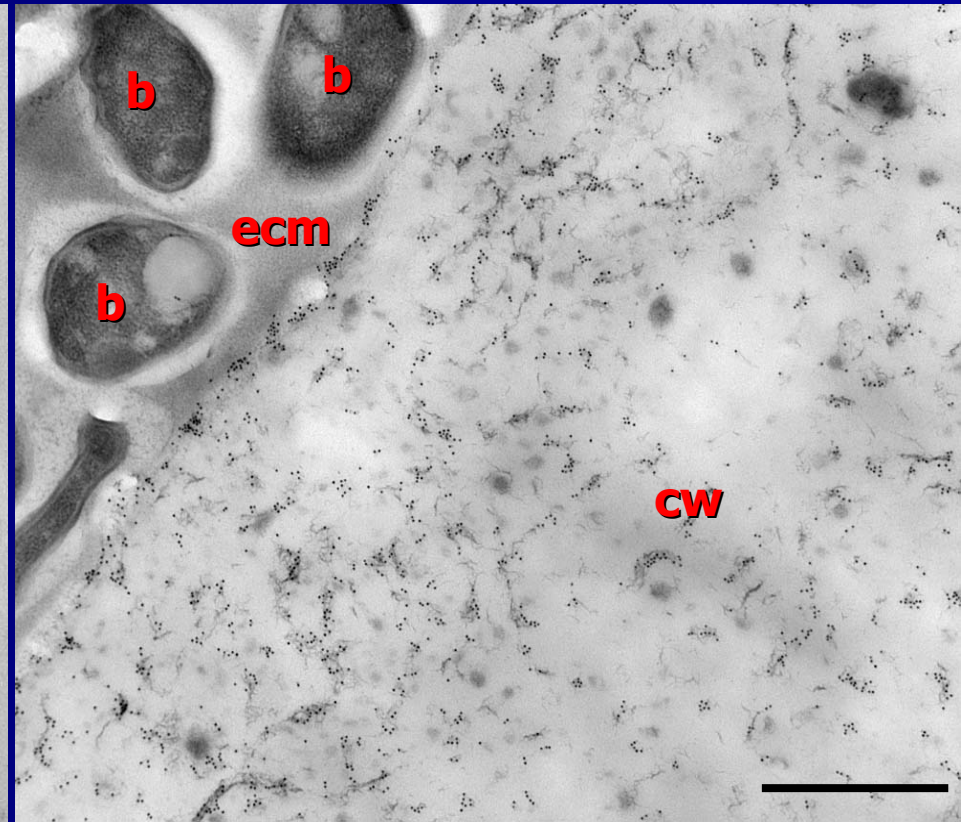


RisFixV (*sym42*)

Immunolocalisation of de-esterified pectin (JIM5) in cell wall of single and double pea mutants (**cw** – cell wall, **b** – bacteria, **ecm** – extracellular matrix)

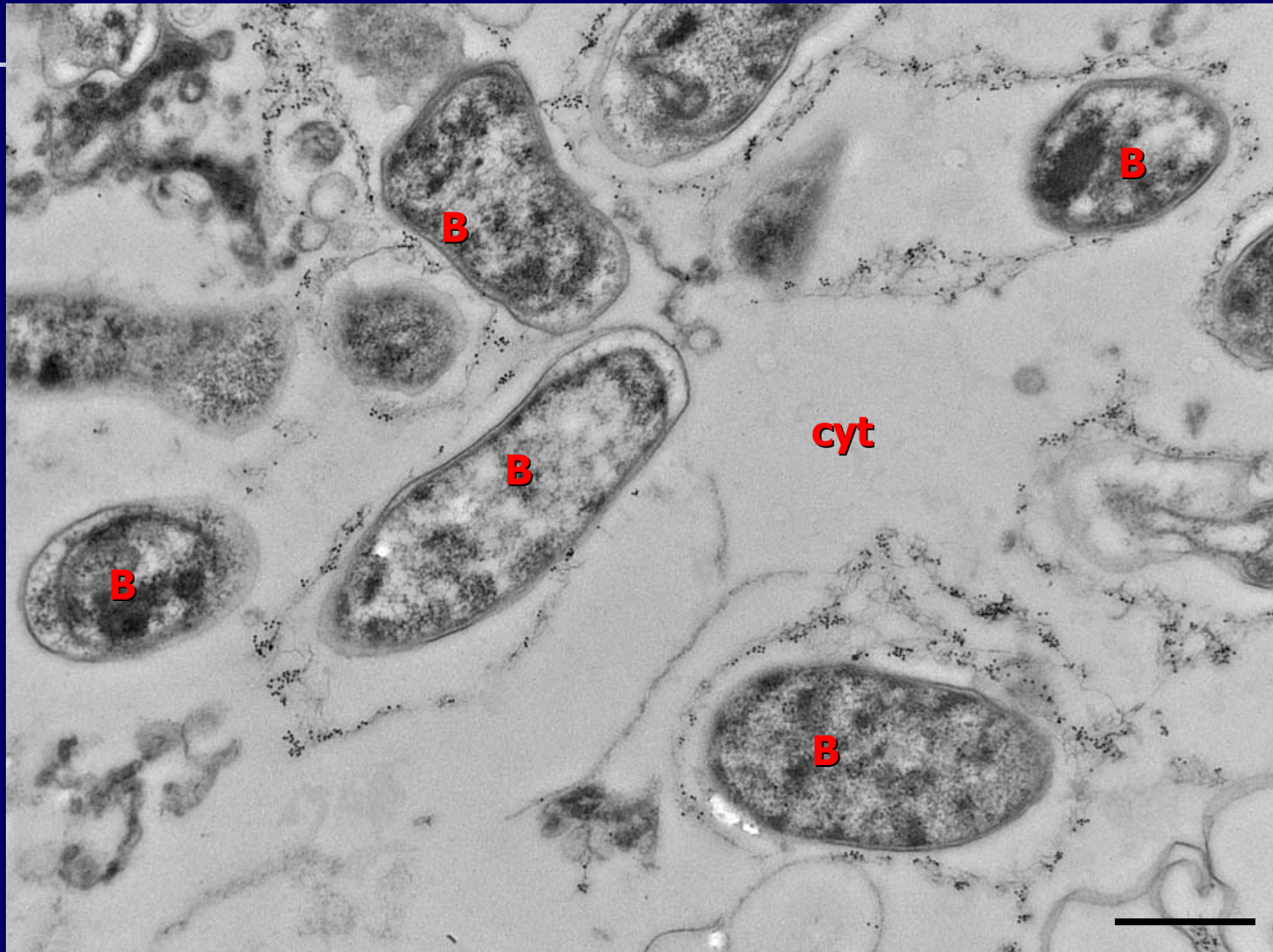


RBT4 (*sym33, sym42*)



RisFixV (*sym42*)

Secretion of pectin (JIM5) around degrading bacteroids in senescent infected cells in single pea mutant *RisFixV* (*sym 42*) (B – bacteroids, cyt – cytoplasm)



Conclusions

- The increase of AGP-extensin synthesis in intercellular spaces in mutant genotypes of pea was revealed as well as the intensification of defense reactions in the form of peroxide-driven cross-linking of AGP-extensin.
- In single mutant RisFixV (*sym42*) it was recognized the intensification of defense reaction in the form of callose synthesis around cell wall of both infection threads and plant infected cell as well as synthesis of pectic components around degrading bacteroids in senescent infected cells.

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