

MGSE Workshop “Stem cells of invertebrates: Their role in development, reproduction & regeneration”  
12<sup>th</sup> July 2017, Münster

### **Stem cells in asexual and sexual reproduction of *Botryllus schlosseri***

**Loriano Ballarin**

University of Padova, Italy

Colonial tunicates are the only chordates able to reproduce both sexually and asexually. Buds have bilateral asymmetry in the blastogenetic and gonadogenetic potential, the former being higher on the right side than on the left, whereas the latter, in terms of number of testes and ovaries, is higher on the left side. New bud primordia originate from both pallear and vascular buds. In the first case, buds form as thickenings of the body wall, including the epidermis, the peribranchial epithelium and the mesenchyme derivatives between them. They inherit the parental epidermis, whereas most of the organs derive from multipotent stem cells in the mesenchyme. In the latter case, buds originate from aggregates of multipotent haemocytes that form most of the internal organs, whereas the epidermis derives from the vascular epithelium.

Stem cells have temporary niches, can enter the circulation, re-circulate within a colony and pass from one generation to another. In addition, they can enter an alien colony, when it fuses with a contacting, genetically compatible colony, where they can colonize the gonads and the soma. In the first case, they can compete with autologous germ cells for the production of gametes.

A homologous of *vasa*, a germ stem cell marker, have been recently identified in various botryllid ascidians. It is expressed in developing gonads and in a subset of circulating haemocytes. The expression is inducible *de novo* in the case of vascular budding, indicating a control of germ line determination, the molecular bases of which are unknown.