

Barbara Boldin

FACULTY OF MATHEMATICS, NATURAL SCIENCES AND
INFORMATION TECHNOLOGIES
UNIVERSITY OF PRIMORSKA
e-mail: barbara.boldin@upr.si

**Within-host viral evolution in a heterogeneous environment:
insights into the HIV co-receptor switch**

From the point of view of a pathogen, a host is a structured and a heterogeneous environment. In the case of HIV, for instance, the existence of spatial structure is supported by the fact that the virus is found in different tissues while environmental heterogeneity originates from the pathogen being able to exploit different types of immune cells. We present a simple mathematical model that incorporates two types of target cells and some spatial structuring and discuss the conditions under which viral diversification occurs within a host. Applying the model to the case of HIV, we show that it captures three main properties of the so called ‘co-receptor switch’ that is observed in many HIV infections: the initial dominance of virus strains that infect CCR5+ cells, the late switch in some (but, importantly, not all) HIV infections and the associated drop in the number of uninfected T-cells. This suggests that the co-receptor switch could result from gradual adaptation of the virus population to target cell heterogeneity. More generally, we argue that evolutionary ecology can help us better understand the course of some infections. The talk is based on joint work with Samuel Alizon [1].

REFERENCES

- [1] A. Alizon, B. Boldin: *Within-host viral evolution in a heterogeneous environment: insights into the HIV co-receptor switch*. *Journal of Evolutionary Biology*, **23**, No. 12, (2010), pp. 2625-2635.