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Interaction of Recombinant Unglycosylated Ovine Prion Protein with Muscovite Mica

E.N. Vasina (1), **P. Déjardin** (1), H. Rezaei (2), J. Grosclaude (2), H. Quiquampoix (3)

(1) European Membrane Institute, UMR 5635 (CNRS, ENSCM, UMII)

Université Montpellier II, CC047 ; 2 Place Eugène Bataillon, F-34095 Montpellier Cedex 5 (France)

dejardin@iemm.univ-montp2.fr; E.N.Vasina@lboro.ac.uk

(2) Laboratoire de Virologie et Immunologie Moléculaires, UR 892, INRA, F-78352 Jouy-en-Josas (France)

rezaei@jouy.inra.fr; jngroscl@jouy.inra.fr

(3) Rhizosphère et Symbiose, UMR 1222 (INRA-ENSAM), 2 Place Pierre Viala, F-34060 Montpellier Cedex 1 (France)

quiquamp@ensam.inra.fr

We have studied the adsorption of an ovine recombinant protein (recPrP), a model for the infectious prion protein, onto muscovite mica. This mineral is considered as a model of clay minerals. The underlying question is the extent to which prion protein is immobilised on the clay minerals in soils, and conversely the extent to which it can be transported by colloid-facilitated transport in the environment *(European Project QLK4-CT-2002-02493).*

The protein was labelled with ^{125}I and solutions were flowed through a cell consisting of two parallel mica sheets. The cell was validated with studies on the adsorption of α-chymotrypsin[1]. γ-radioactivity was monitored throughout the flow period and adsorption kinetics analyzed as a function of pH in the range 4 - 9.

We found an experimental initial adsorption kinetic constant quite close to the transport – controlled limit (wall shear rate 100 s^{-1}), assuming a diffusion coefficient cor-

responding to a single molecule. The result was confirmed by two additional experiments at a different wall shear rate.

Adsorption at the interface was strong and could not be reversed by buffer (pH 4 to 9), by a protein solution (pH 6) or by sheep plasma. However, detergents such as those recommended for the cleaning of laboratory equipment and glass ware, RBS (10%) or Hellmanex 2%, or 0.1M NaOH allowed *almost* complete removal of the adsorbed layer [2]. Alternate use of those chemicals with liquid soap (pH 5) ensures complete removal. As mica and protein are both negatively charged at high pH, this result suggests the importance of the electrostatic component in the process.

1. Elena N. Vasina, Philippe Déjardin, *Langmuir (2004) 20, 8699-8706.*

2. Elena N. Vasina, Philippe Déjardin, Human Rezaei, Jeanne Grosclaude, H. Quiquampoix *Biomacromolecules (2005) 6, 3425-3432*

E.N. Vasina. Present address : Department of Chemical Engineering, Loughborough University, Loughborough,Leicestershire LE11 3TU, UK

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