



	Experiment title: <i>Cerebratulus lacteus</i> hemoglobin mutants	Experiment number: MX129
Beamline: ID14-1	Date of experiment: from: 09/02/2004 to: 09/02/2004	Date of report: 02/07/2004
Shifts: 1	Local contact(s):	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Nardini Marco, Alessandra Pesce Dept. of Physics-INFM, University of Genova c/o X-ray Structural Biology Lab, Advanced Biotechnology Center, Largo Rosanna Benzi, 10, 16132 Genova, Italy		

Report:

A very short hemoglobin (CerHb; 109 amino acids) binds cooperatively O₂ in the nerve tissue of the nemertean worm *Cerebratulus lacteus*, to sustain neural activity during anoxia. Sequence analysis suggests that CerHb tertiary structure may be unique among the known globin fold evolutionary variants. The X-ray structure of oxygenated CerHb (R-factor 15.3 %, at 1.5 Å resolution) displays deletion of the globin N-terminal A-helix, an extended GH region, a very short H-helix, and heme solvent shielding based on specific aromatic residues. The heme-bound O₂ is stabilized by hydrogen bonds to the distal TyrB10-GlnE7 pair. Ligand access to heme may take place through a wide protein matrix tunnel connecting the distal site to a surface cleft located between E- and H-helices.

Recently we obtained crystals of a mutant of CerHb, with the mutated residue located in the protein matrix tunnel. Thanks to the data collected at ESRF, we are now in the process of refining the crystal structure on this mutant at 1.6 Å resolution.