Structural investigations into the avian MHC-I like protein YF1*7.1

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The avian immune system comprised of MHC class-I, MHC class-II, and CD1 genes that are mapped onto chromosome 16 and that are located in the MHC-Y, MHC-B, and CD1 regions, respectively. The MHC-Y genes cluster contains a number of MHC genes including at least two MHC class-I heavy chain loci that have been termed YF1 and YF2. The YF1*7.1 allele is polymorphic and ubiquitously expressed on cells of adult and embryonic chickens. The previously reported structural characterization of an in vitro refolded YF1*7.1 protein revealed that the antigen-binding cleft was hydrophobic and could contain a non-peptidic ligand originating from crystallization conditions. However, the identity of the bona fide bound ligand for YF1*7.1 is still unknown. Here, we recombinantly expressed YF1*7.1 using a mammalian expression system and determined its three-dimensional structure using X-ray crystallography. Our high-resolution crystal structure combined with quantitative methods of electrospray ionization-time of flight mass spectrometry enabled us to identify an endogenous bound ligand to YF1*7.1. The chemical nature of the identified ligand has granted further functional and structural investigations that are currently ongoing and that ultimately will shed light on the biological function played by YF1*7.1 in avian immunity.