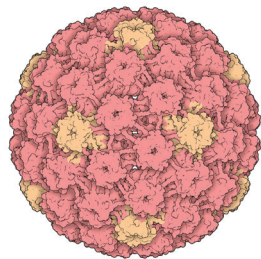


# Build a Paper Model of Human Papillomavirus with Neutralizing Antibodies

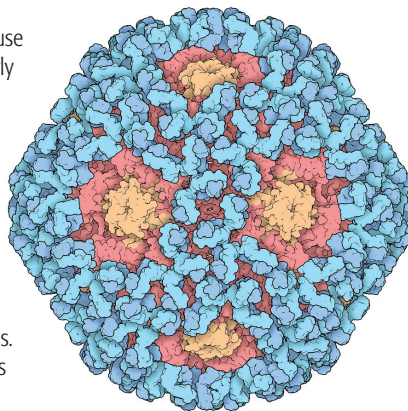


Papillomavirus capsid

Papillomavirus infections usually cause annoying warts, but some particularly virulent types can cause cancer. For example, papillomavirus is the major cause of cervical cancer.

Fortunately, an effective vaccine is available to provide resistance against the virus. The vaccine is made of the major capsid protein of the virus, but is without the DNA

genome normally packaged inside to make it safe and non-infectious. This empty shell is recognized by the immune system and stimulates production of protective antibodies.

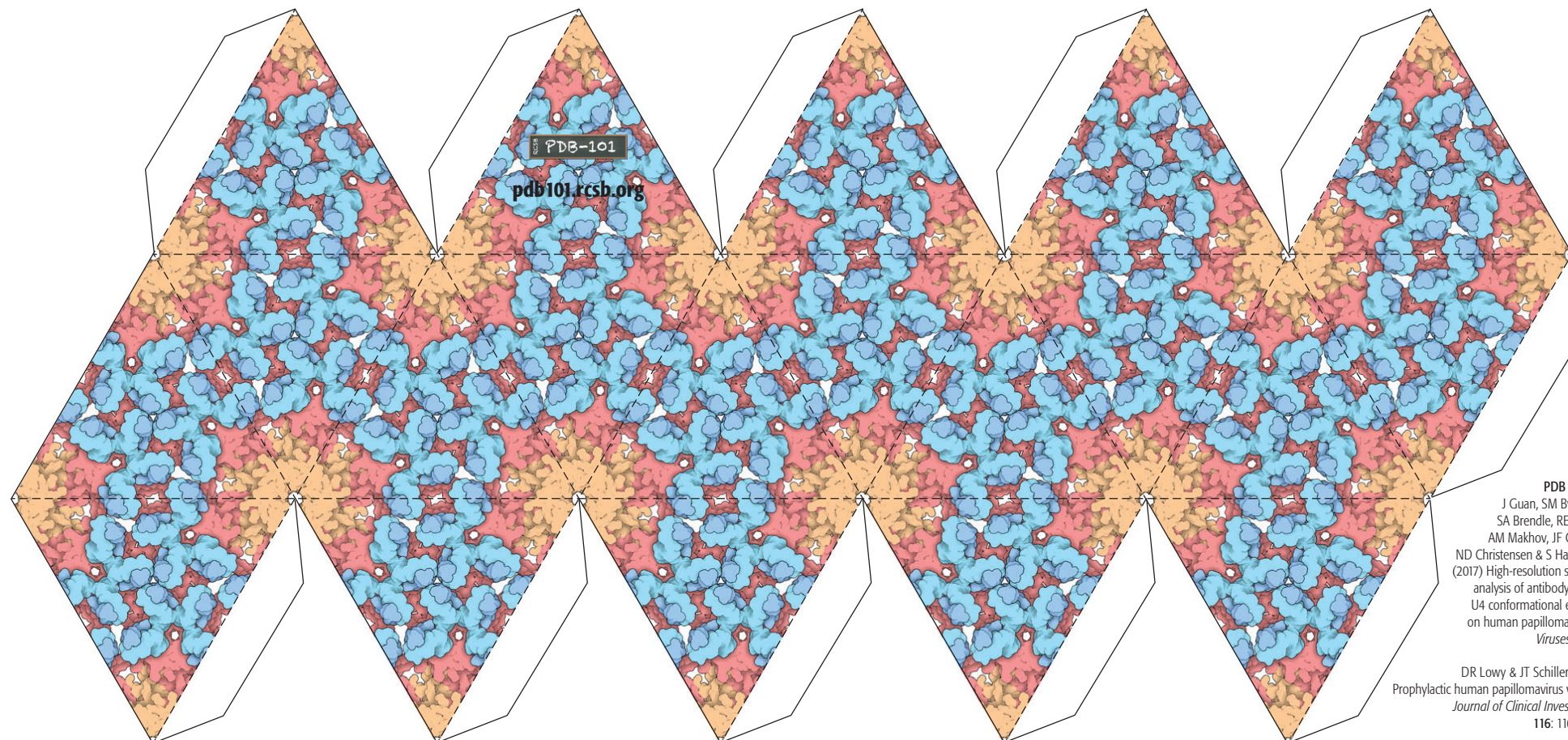


This model shows a structure of the papillomavirus capsid neutralized by a coat of antibodies (blue, the structure includes only the Fab portion of the antibodies). The structure was determined using cryo-electron microscopy.

PDB structure 6bt3

To build the model, **cut out** the structure below along the **solid lines**, and **fold** along the **dashed lines**. Then **tape or glue** the flaps into place to form an icosahedron.

To learn more about viruses, go to [pdb101.rcsb.org/browse](http://pdb101.rcsb.org/browse) and choose **Viruses** from the **Health and Disease** category.



PDB ID 6bt3  
J Guan, SM Bywaters, SA Brendle, RE Ashley, AM Makhov, JF Conway, ND Christensen & S Hafenstein (2017) High-resolution structure analysis of antibody V5 and U4 conformational epitopes on human papillomavirus 16 *Viruses* 9: 374.

DR Lowy & JT Schiller (2006) Prophylactic human papillomavirus vaccines *Journal of Clinical Investigation* 116: 1167-1173.