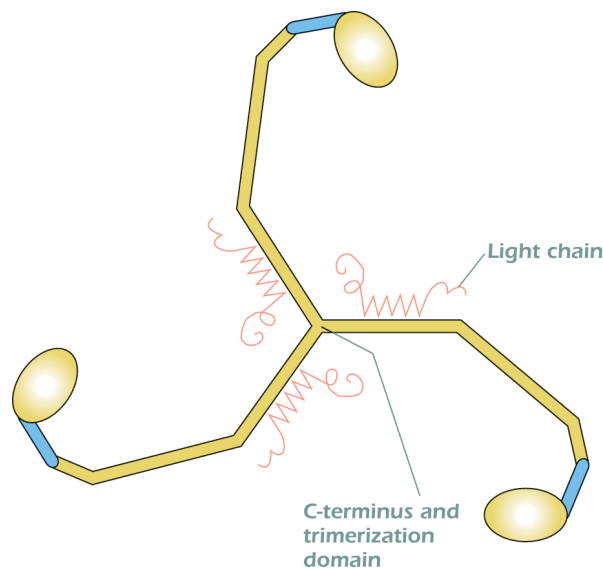


**Chapter 10**  
**Web Text Box 2**

**Clathrin, a three-legged molecule**

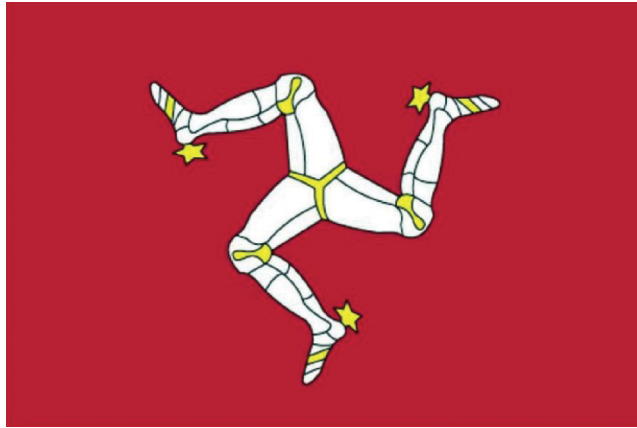
Vesicles do not bud spontaneously from membranes, instead vesicular traffic is driven and controlled by many proteins (book page 167). Some vesicles, involved for instance in traffic between the ER and the Golgi and within the Golgi, use coatamer coats. Coatamer coats look rather fuzzy under the electron microscope and less is known about their structure than is known about the clathrin coat of vesicles involved in selective transport.

Clathrin-coated vesicles appear polyhedral under the electron microscope (see for instance figures 2 and 3 of <http://jcb.rupress.org/content/97/5/1452>). The clathrin makes a geometric cage around the vesicle. Electron microscopy and x-ray diffraction have revealed how these cages are made. A clathrin molecule is a trimer of three chains that associate at their C-terminal domains. The amino end of each chain is globular but the intervening part is mainly superhelical. Three smaller chains are part of the assembly – each binding to one of the three heavy chains. Overall the molecule looks like three legs joined at the top.



**Clathrin, a three legged molecule**

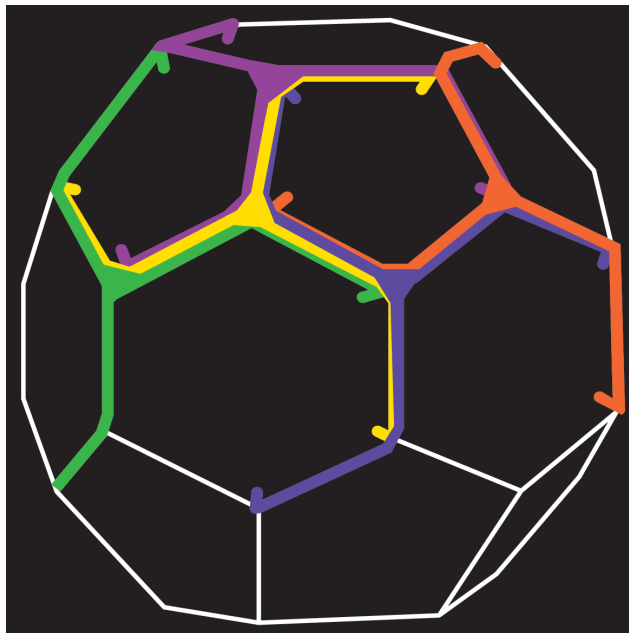
It is called a triskelion from the Greek for three and leg. Triskelion motifs are found in Celtic art and form the symbol of the Isle of Man (a self-governing British dependency that lies between Ireland and the British mainland).



### Isle of Man triskelion

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The legs of clathrin triskelions associate to form the polyhedral cages we see around clathrin-coated vesicles. The diagram below shows a small clathrin cage. Each clathrin triskelion is shown in a different color. The center junctions are found at the vertices of the polyhedra. Triskelion legs are flexible and this allows formation of different sized cages. The light chains are not required for this assembly and probably serve to prevent unwanted cage formation in the cytosol.



**Clathrin, a three legged molecule**

Evolution has found another function for clathrin triskelions in mitosis. Vesicular traffic ceases during mitosis and the triskelions seem to be used to strengthen the mitotic spindle.