Chapter 8
Web Text Box 1

More on the irritating formyl methionine

In Example 8.1 on book page 128 we describe how the immune system is activated by peptides beginning with formyl methionine, because these indicate the presence of proteins made by prokaryotes.

However, the mitochondria in our own cells are thought to have originated as symbiotic aerobic bacteria (book page 10) and, like bacteria, begin proteins with a formyl methionine. Why do these proteins not trigger an immune response?

In fact they can. Under normal circumstances mitochondrial proteins are held safely within cells, well away from patrolling white blood cells. However, during severe tissue trauma enough mitochondrial protein leaks into the extracellular fluid to activate white blood cells, leading to systemic inflammation and organ injury. We can speculate that this process has not been eliminated in evolution because without modern medicine an injury this severe would always be fatal.

For more detail see Zhang et al. 2010. Nature, 464:104-107.