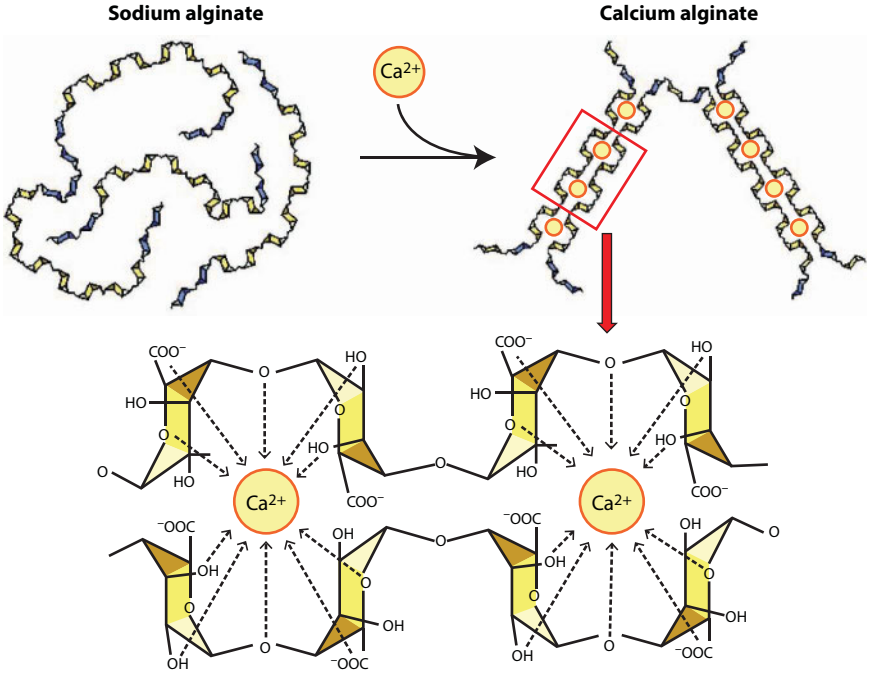

Figure 1.3 Egg-box structure formation during the ionic gelation of sodium ALG [17].

Although it is generally observed that most divalent cations form ALG gels by the "egg-box" formation, it is still not known if other divalent cations follow the same mechanism for gel formation [13–16]. Binding of Ca ion enhances with increasing content of G residues in the chains, while poly-M blocks and alternating MG blocks have lower affinity toward the ion. Generally, by raising the ALG G block content or molecular weight, more strong and brittle ALG gels may be achieved [4]. The affinity of ALG toward Ca ions increases with increasing content of the ion in the gel due to an autocooperative zipper mechanism. This first stage of dimerization is followed by a second stage of lateral association of the dimers at higher Ca^{2+} concentrations. Isolated and purified G blocks have been shown to act as gel modulators, forming higher-order junction zones composed of two or more chains.

Studies have shown previously that there could be different block sequence than G blocks to which cations can bind in ALG. For example, binding studies have recognized that Ca is able to bind to G and MG blocks, Ba can bind to G and M blocks, and Sr can bind to G blocks only [8, 12]. Trivalent cations such as Al^{3+} and Fe^{3+} can also be used to gel ALG.