Figure 1: Actin based aster formation without molecular motors.

Aster-like arrangements of actin bundle emerge in the absence of molecular motors or other accessory proteins. Structures are solely formed by magnesium due to counterion condensation or polyethylene glycol, methyl cellulose, the protein albumin, and dextran inducing depletion forces. We were able to show that aster formation relies on an isotropic filament distribution when switching on bundling effects. Motor activity can support this structure formation, but myosin motors are not the inherent basis for this kind of structural arrangement.

By detecting center points we derived radial distribution functions for all networks, which display an increased probability for finding a next neighbor in a distance of about 5–10 µm or 14–20 µm, respectively [14]. Adapted from Huber et al. [14].

The ability to employ one key component for seemingly contradictory functions requires accessory proteins, which are able to drastically alter properties of the underlying structure. Cells employ a multitude of additional proteins which are usually either associated to actin or microtubules structures. These proteins can form networks or bundles by cross-linking without the need to consume chemical energy [12]. In addition, active accessory proteins called myosins (interacting with actin) or dyneins and...