Breast augmentation is one of the most frequent surgical procedures performed by plastic surgeons. Furthermore, in the majority of breast reconstructions implants are still in use. With the focus on surface modifications and biomaterials, the article provides an overview of the latest trends and concepts in increase of implant biocompatibility and reduction of capsular contracture. Because of the recent events regarding PIP® implants, a short report on this topic is presented as well. The literature was searched for experimental and clinical studies, as well as meta-analysis and reviews, using the databases PubMed, Embase and Cochrane Collaboration. Based on the title, year of publication and abstracts, thematically relevant and recent publications in English or German were selected and full text articles were studied. According to the classification, 4-5 generations of breast implants have been developed since the 1960s. Modifications affected diverse areas including various surface textures as well as coatings with polyurethane or titanium. Some of these changes were able to reduce capsular contracture, however, without resolving the issue sufficiently. Recent experimental studies mostly evaluated different surface coatings with antifibrotic and antibacterial substances. For the local drug release various carrier substances were used. Furthermore, drugs were covalently bonded to the implant surface or applied by surface impregnation. In
different approaches biocompatibility could be increased by biomimicry or nanotechnologically modified biomaterials, which could additionally contribute to the reduction of capsular contracture. The development of coating technologies for the locally controlled sustained drug release using the implant surface as drug delivery system could potentially enable the local administration of drugs, which were orally delivered in clinical trials, and effectively reduced capsular contracture. This kind of application could potentially minimize the risk of adverse side effects. However, there are still some questions concerning controlled drug release systems for implant surfaces, as well as long-term results and possible side effects of drugs in a continuous local administration to be answered in further studies.