# Drug-eluting Stent

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Since the introduction of coronary angioplasty in 1977, restenosis has been a major factor limiting the long-term results of percutaneous transluminal coronary angioplasty (PTCA). The restenosis rate in the first six months after PTCA ranged from 35 to 50 %. Numerous techniques and new devices have been developed in the past two decades in order to improve the long-term success, these included atherectomy, laser, rotablator, brachytherapy and stenting. Only coronary stenting and brachytherapy have been showed to be able to reduce the restenosis rate substantially to 10 to 30%

Now, with the development of drug-eluting stents, the restenosis rates appear to be in the range of close to 5%. There are three components to a drug-eluting stent system : stent design, pharmacological agent and drug carrier vehicle. All these three factors have an important impact on clinical outcome. There are four classes of pharmacological agents under investigation for drug-eluting stent systems currently. These include antineoplastic agents (such as paclitaxel, actinomycin etc.), immunosuppressants (such as sirolimus, everolimus etc.), migration inhibitors (such as batimastat, halofuginone etc.), and tissue-healing enhancement agents (such as 17-beta-estradiol, HMG CoA reductase inhibitor etc.). An array of drug-eluting stent systems, each with unique delivery systems, stent platforms, carrier matrices, and agents used, have shown favorable 6-month angiographic follow-up binary restenosis rates (Table 1).

Table 1. Drug-Eluting Stent Trials

| **Study Acronym** | Company | Stent | Drug |
|---|---|---|---|
| ACTIN | Guidant | Tetra | Actinomycin D |
| ASPECT | Cook | Supra | Paclitaxel |
| DELIVER | Guidant | Penta | Paclitaxel |
| ELUTES | Cook | V-Flex Plus | Paclitaxel |
| EVIDENT | Jomed | Jostent | Tacrolimus |
| PRESENT | Jomed | Jostent | Tacrolimus |
| RAVEL | Cordis/J&J | Bx Velocity | Sirolimus |
| SIRIUS | Cordis/J&J | Bx Velocity | Sirolimus |
| TAXUS I-IV | BCS | Nir/Express | Paclitaxel |

While drug-eluting stents may have a great future, there are still questions unanswered. The local vascular toxicity and tissue interaction to the pharmacological agent remain not fully understood. The efficacy of the carrier vehicle (coating) is still under investigation. The long term results of various kinds of drugs still awaits to be revealed. As new trials develop and results accumulate, the true extent of the benefits of this revolutionary change in interventional cardiology will emerge.