

# Future of graphene in bio-medical application

## Opinion

Over the last few decades, the graphene technology develops rapidly in different areas of application like nano-electronics,<sup>1</sup> composite materials,<sup>2-6</sup> sensors,<sup>7</sup> energy technology<sup>8-10</sup> etc. Graphene basically a 2D nano-materials extracted from 3D graphite, invented by Prof. Andre Geim and Prof. Konstantin Novoselov (Nobel Prize winner 2010, University of Manchester). Graphene is mechanically and thermally a stable material and it is 40 times harder than diamonds for that reason it is much more reliable and durable material.<sup>11</sup> In this topic we are focused on future of graphene in bio-medical application. The recent study on artificial retina implants already developed by Glaxo Smith Kline to treat diseases using graphene based electrical stimuli.<sup>12</sup> Graphene is also useful material for birth control and it prevents the sexually transmitted diseases reported by University of Manchester researcher's team. The Graphene is one of the attractive material for cancer treatments. Recently a new microfluidic bio-chip based on graphene oxide being developed which can caught the tumor cells from blood and support their growth for further analysis.<sup>13</sup> The graphene oxide (GO) is one of the efficient nano-carrier for drug delivery reported by Dai et al.<sup>14</sup> The Genetic therapy using Graphene oxide (GO) is one of the promising approach to treat various diseases caused by genetic disorders, Parkinson's disease, cystic fibrosis etc.<sup>15</sup> Graphene is also useful for bio sensing and bio-imaging. Basically doped graphene, pristine graphene, graphene oxide (GO) and chemically reduced GO (rGO) are useful for bio-sensing application. Using these material we can detect different kind of biomolecules such as thrombin, dopamine, oligonucleotide, ATP, amino acid etc.<sup>16-20</sup> Here, I have explained few recent review work on graphene based nano-material and its application in medical domain. Hopefully, in near future I can contribute some work on graphene for medical application.

## Conclusion

Compared with other fields, we have seen that graphene is progressing dramatically in the field on biomedical applications and is expanding rapidly. The technological advancement made in this research area is remarkable, exciting and encouraging. Still we are facing lots of challenges, however, in near future we must overcome such kind of challenges.

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## Conflict of interest

The authors declare no conflict of interest.

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**Sandip Bhattacharya**

School of VLSI Technology, Indian Institute of Engineering Science and Technology, India

**Correspondence:** Sandip Bhattacharya, School of VLSI Technology, Indian Institute of Engineering Science and Technology, Shibpur, India, Tel 07075654909, Email 1983.sandip@gmail.com

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