iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** XI **Month of publication:** November 2020

DOI: https://doi.org/10.22214/ijraset.2020.32229

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XI Nov 2020- Available at www.ijraset.com

Technological Advancement in Medical Science

Ninad D Chaudhari
Academic Research Student, Department of Information Technology, B.K. Birla College of Arts, Science and Commerce (Autonomous) Kalyan, Maharashtra, India

Abstract: Biochip, the most exciting future technology is an outcome of the fields of Computer science, Electronics and Biology. It is a new type of bio-security device to accurately track information and who is actually doing it. Those chip-based devices can be used to analyze mutations, antigens, cells, etc. Biochip technology is believed to revolutionize the future research in life sciences, disease diagnosis, drug discovery, forensic sciences and outer space exploitation in the coming century. In the past decade high-density DNA microarrays and biochips have revolutionized the field of biomedicine and helped accelerate target validation and drug discovery efforts.
Keywords: Biochips, Detection, Security, Sensors, Design.

I. INTRODUCTION

Biochip implant system is actually a fairly simple device. Biochip implant is basically a small (micro) computer chip, inserted under the skin, for identification purposes. The biochip system is radio frequency identification (RFID) system, using low-frequency radio signals to communicate between the biochip and reader. The application of a biochip using the molecular beacon (MB) detection scheme. The application of a biochip using the molecular beacon (MB) detection scheme. The optimum conditions for the MB system for highest fluorescence detection sensitivity are investigated for the detection system. Microarrays are still predominantly used for gene expression analyses, but they are also finding application in genotyping and resequencing applications, in addition to comparative genomic hybridization studies. Discovery of a mutation in patients can greatly affect the prediction of cancer risk and help the doctors and patient to take the appropriate steps for treatments. These DNA-microarray experiments that can assess tens of thousands of genes simultaneously provide a huge amount of information: for example, information about the roles played by particular genes in drug sensitivity, the effects of drugs on gene expression and the effects of genetic mutations on sensitivity and response. The mixed-technology based microsystem has an emerging category known as microfluidics.

II. OBJECTIVE

A. To analyse whether biochips can trace person and animals through its sensing ability.
B. To verify can biochip trace disease causing germs in person and animal
C. To state that biochips can enhance the performance of scanning systems.

These objectives can be achieved by checking the following hypotheses through survey analysis.
1) Hypothesis-1: Tracking human, animals can be done through biochips that will help in security.
2) Hypothesis-2: Scanning of biochips while diagnosing a patient (animal or human) can help the medical team to enlist the disease causing germs and providing antidote for the same.

III. LITERATURE REVIEW

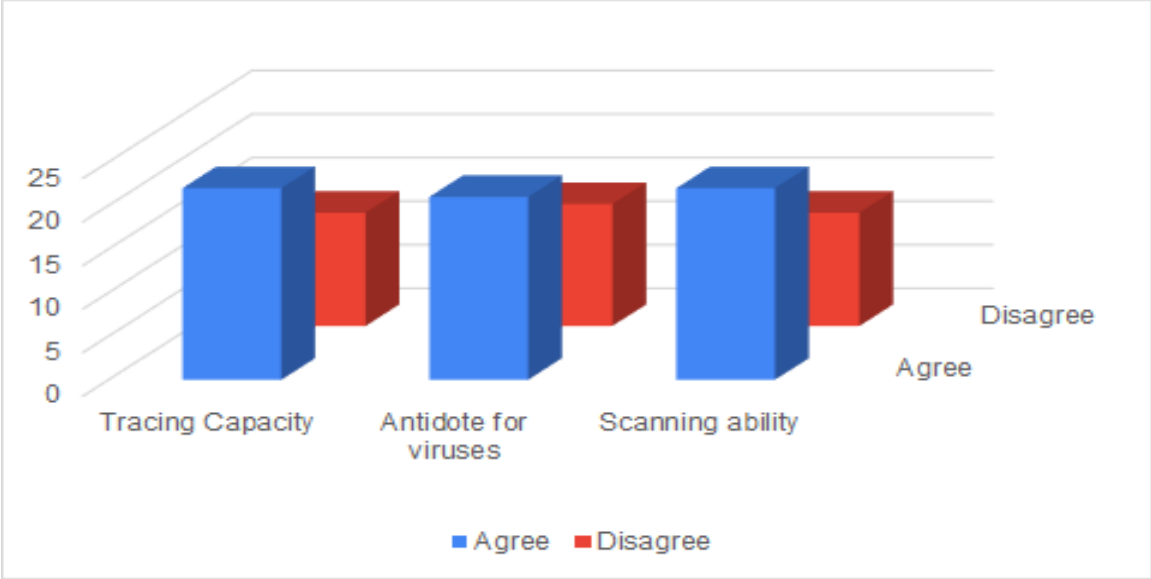
The article Study on Biochips Technology was introduced by Oyebola B. O. et al. The article explains the basic concept of biochip technology and its working. The authors explained detail of the Biochips Technology, its structure and its Economic advantages. They stated the making of biochips, Material used for making biochips, Limitation and Implantable device under construction. The authors aimed at glucose dictator, oxygen sensor and Blood pressure sensor. Authors also state some question and their answers while research and detection of drugs and diagnosis. The article Biochips Molecular Diagnostics: Promises and Possibilities, by Debnath et al. mainly aimed at design of biochip and application of biochips. The study explained the concept of biochip and application of biochips like biochips in drugs detection, disease detection and virus detection. It also stated the future of biochips how it will help in cancer and how biochips technology could become diagnostic tools for humans, veterinary medicine.

IV. METHODOLOGY

This study used a survey analysis through Google Forms to test the proposed hypotheses which was responded by Biology Students, Doctors, Nurses and students aspiring in medical field. The survey was conducted within city limits of Kalyan. The participants were made to view the working of biochip, it's functionality and significance through audio-visual form. In survey analysis few questions were asked about biochip which was used to validate the hypotheses. Each question were presented in the form of multiple choice question having options viz. 'agree' and 'disagree' where the participants had to choose any one of the following options and had to state the reason for the same.

V. EXPERIMENT

The test scores of samples were calculated at the confidence level of 95 percent using chi-sq test. The score of survey parameters were summed and averaged to create overall variable scores. In survey there is three main question were asked to participants i.e. the scanning the biochips while entering and leaving the places can enhance security, using biochips best treatment can be given to the patient infected by virus and track the location of missing person. The participants of the survey were Doctors, Nurse, Pharmacist and Biology Students. The 3D bar graph has shown below are the score of survey analysis in which blue bar represent the how much participant agreed with the concept and red bar represents the how much participant disagreed with the concept. In bar graph tracing capacity demonstrates the outcomes of question based on tracking the people through biochips, Antidote for viruses demonstrates the outcomes of question based on better treatment facility for patient infected by virus, scanning ability demonstrates the outcomes of question based on use of biochips in security places which could help the mankind.



VI. RESULT

The score of samples rendered through survey analysis calculated using the chi-sq test resulted in stating that the most of the participants agreed with the hypothesis-1 viz. “Tracking human, animals can be done through biochips that will help in security." and hypothesis-2 viz. "Scanning of biochips while diagnosing a patient (animal or human) can help the medical team to enlist the disease causing germs and providing antidote for the same.” respectively. Therefore, both the hypotheses are accepted.

VII. CONCLUSION

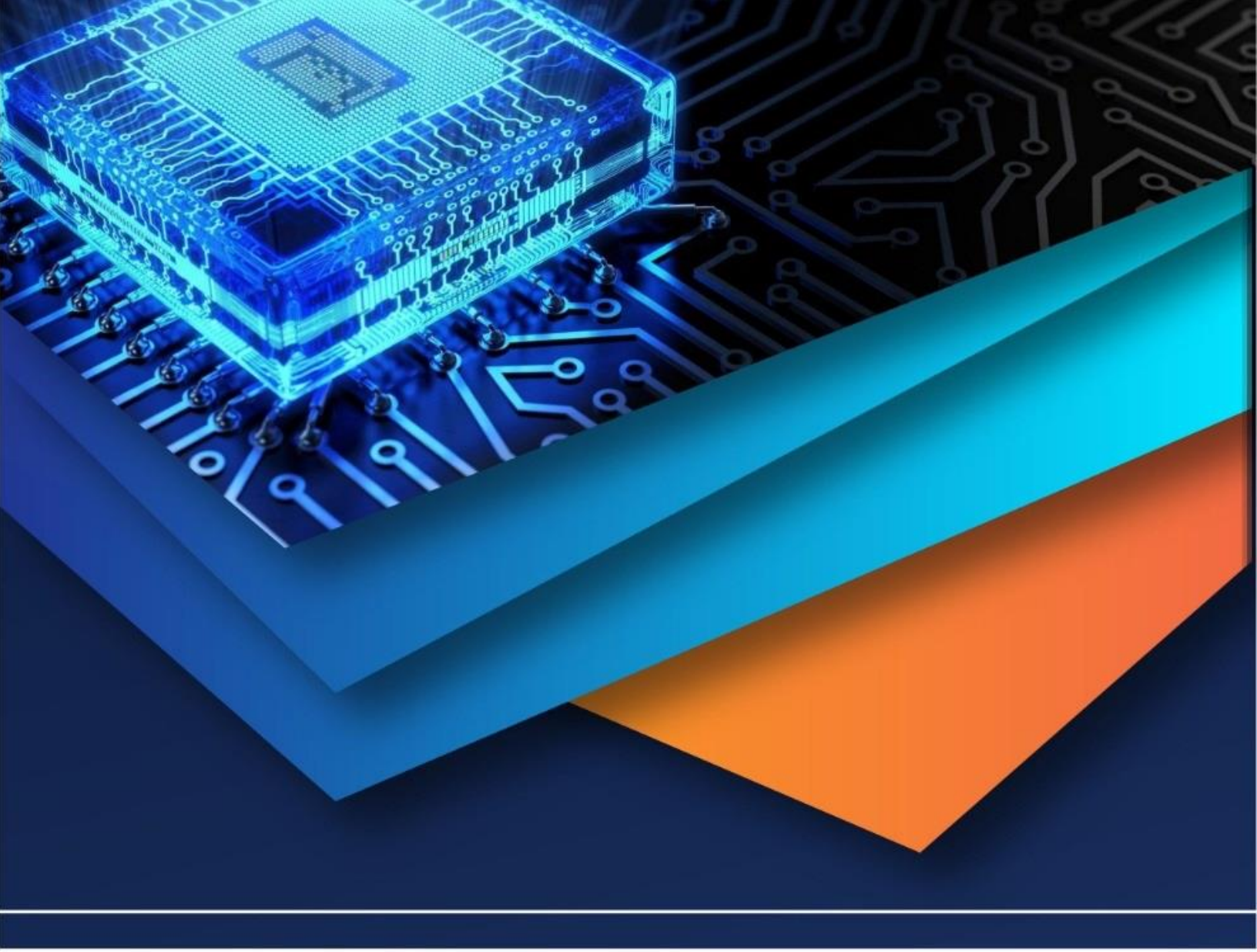
This study has proved that biochips can detect the diseases, virus and can track person and animals through satellite. It proved that Biochips are mainly used in medical science but it can be beneficial for security. The sensor of Biochip is useful for sensing viruses, disease causing germs and in security systems for instance a person can enter or leave a room having biometric lock just by scanning the biochip.

VIII. ACKNOWLEDEMENT

A special gratitude is conveyed to Prof. Swapna Augustine Nikale, Department of Information Technology of B.K. Birla College of Arts, Science and Commerce (Autonomous) Kalyan.

REFERENCES

[1] Oyebola B. O., Odueso V. T. and Olugbemi S. A. (2017), Study on Biochips Technology. Journal Industrial Technology, 2(1):29-37.
[2] Livingston, A. D., Campbell, C. J., Wagner, E. K., & Ghazal, P. (2005b). Ontology Based Semantic Annotations for Biochip Domain. Genome Biology, 6(6), 112. https://doi.org/10.1186/gb-2005-6-6-112
[3] Wick, Ivan & Hardiman, Gary. (2005). Biochip platforms as functional genomics tools for drug discovery. Current opinion in drug discovery & development. 8. 347-54
[4] Culha, M., Stokes, D. L., Griffin, G. D., & Vo-Dinh, T. (2004). Application of a miniature biochip using the molecular beacon probe in breast cancer gene BRCA1 detection. Biosensors and Bioelectronics, 19(9), 1007–1012. https://doi.org/10.1016/j.bios.2003.09.006
[5] Song, J. M., Culha, M., Kasili, P. M., Griffin, G. D., & Vo-Dinh, T. (2005). A compact CMOS biochip immunosensor towards the detection of a single bacteria. Biosensors and Bioelectronics, 20(11), 2203–2209. https://doi.org/10.1016/j.bios.2004.08.033
[6] Gryadunov, D. A., Mikhailovich, V. M., Noskov, A. N., Lapa, S. A., Sobolev, A. Y., Pan'kov, S. V., Rubina, A. Y., Zasedatelev, A. S., & Mirzabekov, A. D. (2001). Detection of Bacillus anthracis Using Multiplex PCR on the Oligonucleotide Biochip. Doklady Biochemistry and Biophysics, 381(1/6), 384–386. https://doi.org/10.1023/a:1013355327920
[7] Thibault, C., Le Berre, V., Casimirius, S., Trévisiol, E., François, J., & Vieu, C. (2005). Direct microcontact printing of oligonucleotides for biochip applications. Journal of Nanobiotechnology, 3(1), 7. https://doi.org/10.1186/1477-3155-3-7
[8] Xu, J., He, X., Zhou, Y., Liu, L., & Cheng, J. (2000). Research and applications of biochip technologies. Chinese Science Bulletin, 45(2), 101–108. https://doi.org/10.1007/bf02884651
[9] S. Shukla, A. K. Agarwal and A. Lakhmani, "MICROCHIPS: A leading innovation in medicine," 2016 3rd International Conference on Computing for Sustainable Global Development (INDIACom), New Delhi, 2016, pp. 205-210.
[10] Kallioniemi, O. (2005). Dissection of molecular pathways of cancer by high-throughput biochip technologies and RNA interference. Breast Cancer Research, 7(S2), 1–63. https://doi.org/10.1186/bcr1086
[11] Rouleau, A., Osta, M., Lucchi, G., Ducoroy, P., & Boireau, W. (2012). Immuno-MALDI-MS in Human Plasma and On-Chip Biomarker Characterizations at the Femtomole Level. Sensors, 12(11), 15119–15132. https://doi.org/10.3390/s121115119
[12] Lee, J.-H., & Jung, H.-I. (2013). Biochip technology for monitoring posttraumatic stress disorder (PTSD). BioChip Journal, 7(3), 195–200. https://doi.org/10.1007/s13206-013-7301-x
[13] EShukla, V., Hussin, F., Hamid, N., & Zain Ali, N. (2017). Advances in Testing Techniques for Digital Microfluidic Biochips. Sensors, 17(8), 1719. https://doi.org/10.3390/s17081719
[14] Su, F., Chakrabarty, K., & Fair, R. B. (2006). Microfluidics-Based Biochips: Technology Issues, Implementation Platforms, and Design-Automation Challenges. IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 25(2), 211–223. https://doi.org/10.1109/tcad.2005.855956
[15] Su, F., & Chakrabarty, K. (2008). High-level synthesis of digital microfluidic biochips. ACM Journal on Emerging Technologies in Computing Systems, 3(4), 1–32. https://doi.org/10.1145/1324177.1324178
[16] Kallioniemi, O.-P. (2001). Biochip technologies in cancer research. Annals of Medicine, 33(2), 142–147. https://doi.org/10.3109/07853890109002069
[17] Gaudin, V., Hedou, C., Soumet, C., & Verdon, E. (2014). Evaluation and validation of a biochip multi-array technology for the screening of 14 sulphonamide and trimethoprim residues in honey according to the European guideline for the validation of screening methods for veterinary medicines. Food and Agricultural Immunology, 26(4), 477–495. https://doi.org/10.1080/09540105.2014.968767
[18] Persidis, A. (1999). Biochips: An Evolving Clinical Technology. Hospital Practice, 34(12), 67–85. https://doi.org/10.3810/hp.1999.11.173
[19] M. Niemeyer *, C. (2005). Self-assembled bioconjugates for biochip technologies. International Journal of Environmental Analytical Chemistry, 85(9–11), 639–643. https://doi.org/10.1080/10615800500158158
[20] Chowdhury, S., Datta, P., Pal, R. K., & Saha, G. (2019). An Efficient Multiple Fault Detection Technique in Digital Microfluidic Biochips. IETE Journal of Research, 1–14. https://doi.org/10.1080/03772063.2019.1571954
[21] Yang, L. (2012). A Review of Multifunctions of Dielectrophoresis in Biosensors and Biochips for Bacteria Detection. Analytical Letters, 45(2–3), 187–201. https://doi.org/10.1080/00032719.2011.633182
[22] Liu, R. H., Dill, K., Fuji, H. S., & McShea, A. (2006). Integrated microfluidic biochips for DNA microarray analysis. Expert Review of Molecular Diagnostics, 6(2), 253–261. https://doi.org/10.1586/14737159.6.2.253
[23] Joos, T. (2004). Protein microarray technology. Expert Review of Proteomics, 1(1), 1–3. https://doi.org/10.1586/14789450.1.1.1
[24] Debnath, M., Prasad, G. B. K. S., & Bisen, P. S. (2009). Biochips. Molecular Diagnostics: Promises and Possibilities, 383–392. https://doi.org/10.1007/978-90-481-3261-4_22
[25] McRae MP, M. D. J. T. (2015). Programmable Bio-Nano-Chip System: A Flexible Diagnostic Platform that Learns. Journal of Biosensors & Bioelectronics, 06(02), 32–12. https://doi.org/10.4172/2155-6210.1000e137



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY