

## Brief review on Biotechnological methods

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### Review Article

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#### ABSTRACT

Biotechnology is the utilization of living frameworks and living beings to create or make stock, or any innovative application those utilizations natural frameworks, living creatures or subordinates thereupon, to shape or alter stock or procedures for particular use. Looking on the instruments and applications, it normally covers with the elated fields of ergonomics, therapeutic forte designing, bio manufacturing.

#### INTRODUCTION

Biotechnology is the combination of traditional science and creatures, cells, elements therefrom, and sub-atomic analogs for things and administrations<sup>[1-20]</sup>. Biotechnology to boot composes on the pure organic sciences. In various cases, it's likewise dependent on learning and techniques from outside the circle of science together with:

- Bioinformatics
- Bioprocess Building
- Biorobotics
- Synthetic Building
- Ergonomics

#### *Bioinformatics*

- The basic side of bioinformatics in arrangement examination is comment. This includes machine variable finding to go searching for protein-coding qualities, RNA qualities, and distinctive deliberate arrangements at interims and appointment. Not the greater part of the nucleotides at interims an appointment region unit a piece of qualities.
- Therapeutic biotechnologist you mull over cells and cell material and build pharmaceutical and symptomatic things that treat and avoid human maladies. You utilize biotechnology, applied science, atomic medical specialty and cell and tissue building for restorative headway.

#### *Bioprocess Buildings*

A bioprocess may be an explicit procedure that utilizations complete living cells or their segments microorganisms, chemicals, chloroplasts to induce wanted things<sup>[21-37]</sup>. Transport of vitality and mass is major to varied organic and natural procedures. Zones, from sustenance handling to heat define of operating to medical specialty gadgets to contamination management and a dangerous part deviation, need data of however vitality and mass may be transported through materials.

- Produce stock that keep up the greater part of the standard guidelines of biopharmaceutical solution. Give each clinical and mechanical amount of remedial cells all through the various phases of advancement.

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- The procedures and generation advancements ought to be climbable. Administration the estimation of items of a definitive medication item.
- This side is imperative to amassing the dream for a monetarily reasonable business.

## ***Bio robotics***

Natural life forms as manipulatable and helpful as robots, or creating natural living beings as segments of robots. Within the last sense, biorobotics is alluded to as a theoretic order of thorough hereditary building within which living beings square measure created and planned by simulated suggests that. The creating of life from non-living matter as an instance would be biorobotics<sup>[38-52]</sup>.

## ***Synthetic Building***

Synthetic Building means of factory-made science is moon-faced off relating to, among regular researchers and designers similarly as within the human sciences, expressions and politics<sup>[53-65]</sup>. One prevailing definition is "outlining and building organic modules, natural frameworks, and organic machines for valuable functions." However, the sensible components of this definition are established in atomic science and biotechnology.

## ***Ergonomics***

Ergonomics as laid out by the universal building science Association is that the utilization of experimental information with respect to people to the look of article frameworks and surroundings for human use. It's moreover alluded to as Biotechnology, Human Engineering or Human Factors Engineering<sup>[66-76]</sup>.

## **MODERN BIOTECHNOLOGY**

People are controlling living things for a great many years. Tests of early biotechnologies encapsulate taming plants and creatures then by determination reproducing them for particular attributes. The revelation that qualities square measure made of deoxyribonucleic corrosive and may be segregated, determined and controlled has light-emanating diode to a fresh out of the plastic new time of late biotechnology. New See land has a few applications for contemporary biotechnologies<sup>[77-85]</sup>.

## ***Applications in biotechnology***

1. DNA ID – Get information sheet: polymer distinguishing proof.
2. DNA organic examination – Get information sheet: polymer natural exploration.
3. Transgenesis.
4. Genome examination.
5. Undifferentiated organisms and tissue building – Get information sheet: Stem cells.
6. Xenotransplantation – Get information sheet: xenotransplant.

## **HUMAN NEEDS AND DEMANDS**

Biotechnologies have an essential part in taking care of human needs and requests in medications, horticulture, legal sciences, bioremediation, biocontrol and biosecurity.

In medications variable change or transgenesis range unit won't to make remedial human proteins in cells or entire creatures. The cell or living being utilized relies on however gigantic and complex the super molecule is. As an example, human endocrine, a tiny low super molecule won't to treat polygenic turmoil, is made in hereditarily planned bacterium, while enormous, extra propelled proteins like hormones or antibodies range unit made in class cells or transgenic creatures<sup>[86-91]</sup>. Plants and creatures are enhanced by choice reproducing for particular qualities or by hereditary change. Valuable attributes is known outwardly or by deoxyribonucleic corrosive distinguishing proof. to Illustrate, ranchers may need plants with weed killer or creepy crawly resistance, resilience to very surprising developing situations or enhanced stockpiling, or they will wish eutherian well evolved creature with higher meat and fleece or imperviousness to wellness. Biotechnologies use life forms or some portion of living beings to create Associate in nursing item to fulfill a specific human would like. This raises social and ethical problems that are essential to speak regarding. Life forms or elements of living beings may be utilized to straighten out contamination in soil, water or air<sup>[92-99]</sup>. In New Island, bioremediation has been counseled as a viable technique for activity the poison pollutant from the dirt. Biocontrol is that the purpose at that one organic structure

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is used to manage the degree of another. Biocontrol techniques are being utilized as an area of recent island to manage obtrusive plants and bugs. DNA identification is used as an area of scientific investigation to acknowledge deoxyribonucleic acid tests at a wrongdoing scene or to choose parentage.

## CONCLUSION

Acknowledging new applications for biotechnology in an exceedingly nonmedical space protection, for example would require the apparatus of organic controls to territories outside antiquated restorative innovation. The biotechnology exchange is way less stricken by the military for its presence than various commercial ventures with that the military and distinctive administrations have chronically collaborated. to stay pace with the new rate of disclosure and thusly the foreseen increment in biotechnology advancements, the military can need to set up new, powerful associations with the rising biotechnology exchange, take part in examination, influence investigation and improvements inside the modern area, and build up its inward abilities to follow up on open doors as they emerge. The open doors in biotechnology specified amid this report region unit compressed. Each thing incorporates the board of trustees' advised venture need, measurable time allotment for acknowledgment or so much term and level of business interest. The council directed Associate in nursing speculation need of high, medium, or low for each biotechnology space covered by the study.

## REFERENCES

1. Gomez-Casati DF. Metabolomics Applications in Plant Biotechnology. *Metabolomics*. 2016;6:e146.
2. Gupta A, et al. Extraction of Proteases from Medicinal Plants and their Potential as Anti-Viral Targets. *J Biotechnol Biomater*. 2016;6:228.
3. Ganapathy M and Bhunia S. Nutraceuticals: The New Generation Therapeutics. *Adv Tech Biol Med*. 2016;4:179.
4. Shrivastava S, et al. Co-exposure Effects of Selenium and Mercury on Phaseolus vulgaris Excised Leaves Segment by Enhancing the NR, Anti-oxidative Enzyme Activity and Detoxification Mechanisms *Adv Tech Biol Med*. 2016;4:178.
5. Singh B, et al. The Holy Grail of Designer Probiotics; Designer Probiotics: The Probiotics with Multiple Health Benefits. *J Gastrointest Dig Syst*. 2016;6:415.
6. Sathelly K, et al. Establishment of Efficient Regeneration System from Leaf Discs in Long Pepper an Important Medicinal Plant (*Piper longum* L.). *Med Aromat Plants*. 2016;5:248.
7. Nandy SK. Bioprocess Technology Governs Enzyme Use and Production in Industrial Biotechnology: An Overview. *Enz Eng*. 2016;5:144.
8. Roy A, et al. Effect of Different Media and Growth Hormones on Shoot Multiplication of In Vitro Grown Centella asiatica Accessions. *Adv Tech Biol Med*. 2016;4:172.
9. Zain M, et al. Association of Family History of Type 2 Diabetes with COMT Gene Polymorphism (I/D) in Pakistani Population. *J Down Syndr Chr Abnorm*. 2016;2:108.
10. Jasdeep CP and Avijit T. Genetic Transformation and Transgenic Wheat Development: An Overview. *Clon Transgen*. 2016;5:147.
11. Li T, et al. Effects of Different Carotenoids on Pigmentation of Blood Parrot (*Cichlasoma synspilum* × *Cichlasoma citrinellum*). *J Aquac Res Development*. 2016;7:414.
12. Lee JR, et al. Effects of HERV-R env Knockdown in Combination with Ionizing Radiation on Apoptosis-Related Gene Expression in A549 Lung Cancer Cells. *Biochem Physiol*. 2016;5:200.
13. Gupta A and Chaphalkar SR. Immunopharmacological Activity of Saponin from Terminalia arjuna and Prosopis spicigera. *J Pharma Reports*. 2016;1:102.
14. Carvalho C and Santos G. Sustainability and Biotechnology – Natural or Bio Dyes Resources in Textiles. *J Textile Sci Eng*. 2016;6:239.
15. Gui H, et al. Evaluation of Factors Impacting Agrobacterium-mediated Indica Rice Transformation of IR58025B - a Public Maintainer Line. *J Rice Res*. 2016;4:163.
16. Tomar A, et al. Effect of Copper Sulphate on the Regulation of Nitrogen Metabolism in the Rita ritaFish. *J Fisheries Livest Prod*. 2015;3:146.
17. Abu-Serie MM, et al. In Vitro Sustained Differentiation of Rat Colon Epithelial Stem Cells. *Biochem Anal Biochem*. 2015;5:239.

# Research and Reviews Journal of Pharmaceutical Quality Assurance

18. Öztürk A. The Use of *Streptomyces coelicolor* in the Removal of Heavy Metals. *Adv Tech Biol Med.* 2016;4:168.
19. Kushwah RS, et al. Co-Habitation and Concurrent Infection of Dengue and Chikungunya Viruses in *Aedes Aegypti* Field Populations from India. *J Trop Dis.* 2015;4:194.
20. Paniagua-Michel J and Olmos-Soto J. Modern Approaches into Biochemical and Molecular Biomarkers: Key Roles in Environmental Biotechnology. *J Biotechnol Biomater.* 2016;6:216.
21. Buhari Muhammad L, et al. Role of Biotechnology in Phytoremediation. *J Bioremed Biodeg.* 2016;7:330.
22. Ganapathy M. Plants as Bioreactors- A Review. *Adv Tech Biol Med.* 2016;4:161.
23. Igwe JC, et al. Tetracycline Resistant Genes in *E. coli* Isolated from UTI and Diarrhea Patients in Zaria, Nigeria. *Clin Microbiol.* 2015;4:225.
24. Porebska I, et al. DPA Release and Germination of *Alicyclobacillus acidoterrestris* Spores under High Hydrostatic Pressure. *J Nutr Food Sci.* 2015;5:438.
25. Frimpong GK, et al. Gamma Irradiation Effect on the Phytochemical and Sensory Quality of Minimally Processed Cabbage in Selected Supermarkets in Accra – Ghana. *J Yoga Phys Ther.* 2015;5:206.
26. Barh D, et al. Are We Ready for Real-Time Applications of Clinical NGS?. *Next Generat Sequenc & Applic.* 2015;2:122.
27. Lazim MIM, et al. Quantification of Cytokinins in Coconut Water from Different Maturation Stages of Malaysia's Coconut (*Cocos nucifera* L.) Varieties. *J Food Process Technol.* 2015;6:515.
28. Devi U, et al. Genomic and Functional Characterization of a Novel *Burkholderia* sp. Strain AU4i from Pea Rhizosphere Conferring Plant Growth Promoting Activities. *Adv Genet Eng.* 2015;4:129.
29. Wang W, et al. Peptides Identified Through Phage Display for Prostate Cancer Imaging and Therapy. *J Pharmacogenomics Pharmacoproteomics.* 2015;6:e150.
30. Koyani RD, Rajput KS (2015) Solid State Fermentation: Comprehensive Tool for Utilization of Lignocellulosic through Biotechnology. *J Bioprocess Biotech* 5:258.
31. Ayub A, et al. Co evolution of Man and microbial pathogenic genome. *Mol Biol.* 2015;4:141.
32. Yadav S, et al. Bulked Segregant Analysis to Detect Main Effect of QTL Associated with Sheath Blight Resistance in BPT-5204/ARC10531 Rice (*Oryza sativa* L). *J Rice Res.* 2015;3:149.
33. Yanelda G, et al. Retrospective Study of Periocular Non Melanoma Skin Cancer Treated with the Combination of IFN alpha2b and Gamma (HeberPAG). *J Clin Exp Ophthalmol.* 2015;6:478.
34. Sticklen M. Consolidating the Feedstock Crops Cellulosic Biodiesel with Cellulosic Bioethanol Technologies: A Biotechnology Approach. *Adv Crop Sci Tech.* 2015;3:e133.
35. Wijerathna YMAM. Production of Kefiran in Kefir Grains and Its Effects on the Rheological Properties Low Protein Wheat Dough and Quality of France Bulky Bread. *Adv Crop Sci Tech.* 2015 3:187.
36. Werner N, et al. Expression of a Codon-Optimized *Carica papaya* Papain Sequence in the Methylophilic Yeast *Pichia pastoris*. *J Microb Biochem Technol.* 2015;7:313-317.
37. Jackson AD and McCullough MBA. Biomechanics: A Frontier Microbial Biotechnology. *J Microb Biochem Technol.* 2015;7:257.
38. Li P, et al. Identification of an Alpha- Tubulin Gene from the Chinese Mitten Crab *Eriocheirsinensis*: Expression Profiles under Immune Challenge and during Larval Development. *J Biotechnol Biomater.* 2015;5:201.
39. Freitas JHES, et al. Evaluation of the Potential of Cadmium and Dyes Removal by Chitosan Obtained from *Zygomycetes*. *J Mol Genet Med.* 2015;S4:003.
40. Helmy Q and Kardena E. Petroleum Oil and Gas Industry Waste Treatment; Common Practice in Indonesia. *J Pet Environ Biotechnol.* 2015;6:241.
41. Desai T and Srivastava S. Constraints-Based Modeling to Identify Gene Targets for Overproduction of Ethanol by *Escherichia coli*: The Effect of Glucose Phosphorylation Reaction. *Metabolomics.* 2015;5:145.
42. Randhawa KKS. Environmental Biotechnology Research: Why it Matters now More Than Ever?. *J Pet Environ Biotechnol.* 2015;S6:e001.
43. El-ghanam AA, et al. Bio-Suppression of Strawberry Fruit Rot Disease Caused by *Botrytis cinerea*. *J Plant Pathol Microbiol.* 2015;S3:005.
44. Ahmad N and Mehmood MA. RNA-Seq: A Powerful Tool for Cataloguing the Transcriptome. *Next Gener Seq Appl.* 2015;2:e103.

# Research and Reviews Journal of Pharmaceutical Quality Assurance

45. Sana M, et al. Miracle Remedy: Inhibition of Bacterial Efflux Pumps by Natural Products. *J Infect Dis Ther.* 2015;3:213.
46. Pandey S, et al. Insilico Analysis of cis acting Regulatory Elements CAREs in Upstream Regions of Ascorbate Glutathione Pathway Genes from *Oryza sativa*. *Biochem Physiol.* 2015;4:159.
47. Jiddere G and Filli KB. The Effect of Feed Moisture and Barrel Temperature on the Essential Amino Acids Profile of Sorghum Malt and Bambara Groundnut Based Extrudates. *J Food Process Technol.* 2015;6:448.
48. Raveendran VV. Camptothecin-Discovery, Clinical Perspectives and Biotechnology. *Nat Prod Chem Res.* 2015;3:175.
49. Amara AAF. The Need for Early Detection of the Prototype Mutants: Sickle Cell Anemia as a Case Study. *J Proteomics Bioinform.* 2015;S8:006.
50. Micó F and Buxadó JA. Havana Biennial 2015. *J Mass Communicat Journalism.* 2015;5:251.
51. Kumar S. Biosafety and Biosecurity Issues in Biotechnology Research. *Biosafety.* 2015;4:e153.
52. Ahangari G, et al. Significant Association between Catechol Amine OMethyl Transferase (COMT) Gene Expression Changes and Breast Cancer Pathogenesis. *J Carcinog Mutagen.* 2015;6:219.
53. Paniagua-Michel J and Rosales A. Marine Bioremediation - A Sustainable Biotechnology of Petroleum Hydrocarbons Biodegradation in Coastal and Marine Environments. *J Bioremed Biodeg.* 2015;6:273.
54. Ghorbel H, et al. Benefic Interactive Effects between Garlic Consumption and Serum Iron Excess. *J Clin Toxicol.* 2015;5:224.
55. Nasim Z, et al. Negligence of Hepatitis C Virus Genotyping in Pakistan: Reason for the Increasing Non-Responsiveness to Interferon Therapies. *J Antivir Antiretrovir.* 2014;6:153-153.
56. Borgoyakova MB, et al. Isolation And Studying of Specificity of Bacteriophages Binding To Murine Lung Adenocarcinoma. *Biol Med.* 2015;S2:002.
57. Pandey V and Kumar V. Breast Cancer Care-Rethink and Redesign. *J Clin Exp Pathol.* 2015;5:e118.
58. Jamil NAM, et al. Liquid Chromatography MS/MS Responses on Lentinan for Structure Characterization of Mushroom Polysaccharide  $\beta$ -D-Glucan. *J Chromatogr Sep Tech.* 2014;6:260.
59. Shah MP. Environmental Bioremediation: A Low Cost Nature's Natural Biotechnology for Environmental Clean-up. *J Pet Environ Biotechnol.* 2014;5:191.
60. Shabani S, et al. Correlation among MDR1, MRP and hTERT Genes Expression Level and Clinical Response in Colorectal Cancer Patients. *J Mol Biomark Diagn.* 2014;5:187.
61. Mehmood MA and Sehar U. Use of Bioinformatics Tools in Different Spheres of Life Sciences. *J Data Mining Genomics Proteomics.* 2014;5:158.
62. Singh DP, et al. Altered Monoamine Metabolism in High Fat Diet Induced Neuropsychiatric Changes in Rats. *J Obes Weight Loss Ther.* 2014;4:234.
63. Bravo-Madrigal J. in vitro Immunization: Perspectives on the Development of a System to Assess Vaccine Immunogenicity. *J Bacteriol Parasitol.* 2014;5: e121.
64. Saldivar RP, et al. Algae Biofuels Production Processes, Carbon Dioxide Fixation and Biorefinery Concept. *J Pet Environ Biotechnol.* 2014;5:185.
65. Hidalgo A, et al. The Use of Patents to Assess National Innovation Systems: Evidences from Spanish Biotechnology. *Intel Prop Rights.* 2014;2:122.
66. Wani SH and Sah SK. Biotechnology and Abiotic Stress Tolerance in Rice. *J Rice Res.* 2014;2:e105.
67. Ahmed FE. Role of MicroRNA Molecules in Colon Cancer Etiology. *Biol Med.* 2014;6:201.
68. Anouti FA. Concerns Regarding Food Biotechnology: An Ongoing Debate. *J Biodivers Biopros Dev.* 2014;1:106.
69. Shabani S, et al. Investigation of hTERT Expression Level and its Relation with Clinicopathological Features and Resistance to Chemotherapy in Colorectal Cancer Patients. *J Mol Biomark Diagn.* 2014;5:176.
70. Vicaria JM. Hollow-fiber Bioreactors: Present and Future in the Biotechnology Industry. *J Membra Sci Technol.* 2013;3:e118.
71. Sharry S. Communicating Biosafety-A New Approach for Agrobiotechnology Adoption. *Agrotechnol.* 2013;2:e107.



# Research and Reviews Journal of Pharmaceutical Quality Assurance

72. Dan PD, et al. Analysis of the Membrane Proteins in Human Serum. *J Proteomics Bioinform.* 2013;6:296-301.
73. Nicolini C, et al. From Nanobiotechnology to Organic and Biological Monitoring of Health and Environment for Biosafety. *Biosafety.* 2013;2:116.
74. Fufa M. Genetic Divergence in Ethiopian Coriander (*Coriandrum sativum* L.) Accessions. *Adv Crop Sci Tech.* 2013;1:116.
75. Nicolini C, et al. From Nanobiotechnology to Organic and Biological Monitoring of Health and Environment for Biosafety. *J Bioanal Biomed.* 2013;5:108-117.
76. Chebil S, et al. Occurrence of *Agrobacterium* *Vitis* Carrying Two Opine-Type Plasmids in Tunisian Vineyards. *J Plant Pathol Microb.* 2013;4:175.
77. Yang WC. Myeloid-derived Suppressor Cells in Autoimmune Diabetes: Their Anti-diabetic Potential and Mechanism. *J Diabetes Metab.* 2013;S12:004.
78. Nezhad Fard RM, et al. The History of Modern Biotechnology in Iran: A Medical Review. *J Biotechnol Biomater.* 2013;3:159.
79. Dahiya MS and Yadav SK. Scanning Electron Microscopic Characterization and Elemental Analysis of Hair: A Tool in Identification of Felidae Animals. *J Forensic Res.* 2013;4:178.
80. El Meskaoui A. Plant Cell Tissue and Organ Culture Biotechnology and Its Application in Medicinal and Aromatic Plants. *Med Aromat Plants.* 2013;2:e147.
81. López-Saura PA, et al. Medical Practice Confirms Clinical Trial Results of the Use of Intralesional Human Recombinant Epidermal Growth Factor in Advanced Diabetic Foot Ulcers. *Adv Pharmacoepidem Drug Safety.* 2013;2:128.
82. Chen S. Lipids Based Docosahexaenoic Acid (DHA) Carriers and their Ability to Deliver DHA to the Brain: A Prospective Outline. *J Bioequiv Availab.* 2013;5:e28.
83. Pan NC, et al. Application of Biotechnology in the Colouration of Jute Fabric Using Vinyl Sulphone Type of Reactive Dyes. *J Textile Sci Eng.* 2013;3:128.
84. Josic D and Giacometti J. Foodomics-Use of Integrated Omics in Nutrition, Food Technology and Biotechnology. *J Data Mining Genomics Proteomics.* 2013;4:e106.
85. Buonocore F. Marine Biotechnology: Developments and Perspectives. *J Aquac Res Development.* 2013;4:e105.
86. Lai EPC. Recent Advances of Liquefied Petroleum Gas Sensors—From Environmental to Biotechnology Applications. *J Phylogenetics Evol Biol.* 2013;4:e117.
87. Ntougias S. Alkaliphilic Lactic Acid Bacteria: Novel Sources for Genetic Engineering and Biotechnology. *Gene Technology.* 2012;1:e102.
88. Lai EPC. Development of Molecularly Imprinted Polymers – from Environmental Sensors to Biotechnology Applications. *J Phylogenetics Evol Biol.* 2012;3:e113.
89. Khraiweh B. Environmental Biotechnology under a Changing Climate. *J Biotechnol Biomaterial.* 2012;S8:e001.
90. Hefferon KL. SiRNA in Vivo Delivery Systems: A New Frontier in Biotechnology. *J Vaccines Vaccin.* 2012;3:e109.
91. Mpofu IDT. What does Petroleum, Environment and Biotechnology means to us vis a vis the Profit Equation? *J Pet Environ Biotechnol.* 2012;3:e110.
92. Wang Q (2012) Metabolic Engineering for Industrial Biotechnology. *Single Cell Biol* 1:e110.
93. Kau CH. Biotechnology in Orthodontics Photo Biomodulation. *Dentistry.* 2012;2:e108.
94. Pinelli A, et al. Identification of Factors Causing Sudden Coagulation in Patients with Acute Myocardial Infarction. *J Clin Exp Cardiol.* 2012;3:202.
95. Albillos SM. Detection Problems Associated to Processed Food Allergens. *J Food Process Technol.* 2012;3:e104.
96. Agostino AD, et al. Semi-interpenetrated Hydrogels Composed of PVA and Hyaluronan or Chondroitin Sulphate: Chemico-Physical and Biological Characterization. *J Biotechnol Biomater.* 2012;2:140.
97. Nageswaran N, et al. Antibiotic Susceptibility and Heavy Metal Tolerance Pattern of *Serratia marcescens* Isolated From Soil and Water. *J Bioremed Biodeg.* 2012;3:158.

# Research and Reviews Journal of Pharmaceutical Quality Assurance

98. Lai EPC and Iqbal Z. Development of Antimicrobials against Escherichia coli - Environmental Microbiology meets Chemical Biotechnology. J Pet Environ Biotechnol. 2012;3:e106.
99. Park EY. Potential of Silkworm in Biotechnology. J Biotechnol Biomaterial. 2012;S9:e001.