
Future Medicine such as Gene or Stem Cell Therapy Are Better Than Non biological or Some Biological (Antibiotic) Medicine

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Abstract: At present all the drug both some biological (only antibiotic or antimicrobial agent) and Non biological drug gradually decrease their efficacy. Biological drugs such as antimicrobial agents, antibiotics are gradually resistance by microorganism. After 20 to 40 years later 60 to 90 percent antibiotics or antimicrobial agents will be resistance by microorganism. Non biological drug could not bind properly with their specific receptor due to structural change of receptor or decrease the affinity of drug to receptor. After 30 to 40 years later the drug efficacy will be gradually decrease at low level and show low therapeutic effect. At this time the innovative treatment such as gene therapy, stem cell therapy are the more dependable treatment for control or prevent or cure of the diseases. Specific gene therapy used for specific disease control or cure. Manipulation of gene in the human cell and produce protective agent (such as protein, antibody, enzyme) which inhibit the growth or kill of the microorganism and also control the hormonal diseases and cellular function and this protective agent such as protein which bind with receptor (structural change receptor which could not bind with Non biological drug) and give the desire function. On the other hand, stem cell therapy which control the all abnormal cell such as cancer cell, hormonal disfunction cell etc and prevent the diseases and give the desires cellular function.

Keywords: Non biological Drug, Antibiotic, Gene Therapy, Stem Cell Therapy

1. Introduction

Gene therapy is the therapy where nucleic acid polymers are used to delivery into patient's cell as a drug to treat the disease and using an adenovirus vector which is insert the new gene into cell and this gene make a functional protein to treat or control of the disease and it is also used to treat the cancer or hormonal diseases [1], [2]. On the other hand, stem cell therapy is the therapeutic delivery of stem cell into patient's body to treat or prevent of the disease or condition such as blood stem cell used to treat the blood diseases and it is also known as regenerative medicine [3], [4]. Stem cell grow in a lab and manipulated of specialize cell into specific types cell such as heart muscle cells, blood cells, nerve cells [4], [5]. In case of defective or injured heart muscle cell, stem cell contributes to repairing defective or injured heart muscle cells [6], [7].

Non biological drug are chemical substance which

obtained by chemical synthesis processes and their structure is known and it is used to treatment of diseases, cure of disease, control of diseases. non biological drugs such as losartan, metformin, atenolol, propranolol, paracetamol, ranitidine, atropine etc bind with receptor or enzyme and stimulate or inhibit the receptor or enzyme and give desire action [8], [9], [10]. On the other hand, antibiotic (biological drug) are chemical substance which obtain from biological sources such as different microorganism [11], [12]. Antibiotic such as penicillin, cephalosporin are used to growth inhibit or kill of the microorganism but at present, antibiotic are resistance by microorganism and Non biological drug gradually decrease their efficacy and so in future gene therapy and stem cell therapy are more dependable than antibiotic or Non biological drug [1], [3], [4], [9], [10], [13], [14].

2. Method

For the purpose of research work, 20 specimens are divided into 2 group. 1st group for Non biological drug study and contain 10 specimens (patient's) and 2nd group for biological(antibiotic) drug study and contain 10 specimens.

2.1. Non Biological Drug Study

1st group (Non biological drug) are sub divided into 3 group such as A, B, C group. A group contained 3 specimen(patient's) and patient's had hypertention disease and applied antihypertensive drug such as losartan, bisoprolol; B group contained 3 specimen (patient's) and patient's had diadetes disease and applied antidiabetes drug such as metformin, glibenclamide; C group contained 4 specimen (patient's) and patient's had asthma disease and applied antiasthmatic drug such as theophylline, inhaler. 1st group had been monitoring for 4 years and recorded their dose requirement and disease condition.

3. Result

3.1. Non Biological Drug Study

Table 1. Non biological drug study and increase the amount of dose for diseases control.

Patient's no.	Sex and age(during initial dose)	Drug name (primary)	disease	Initial dose for disease control per /day	After 3 years,dose for disease control/day	After 4 years,dose for disease control/day
01(group-A)	Male,58	Losartan	Hypertension	Losartan 50 mg	Losartan 100mg	Losartan 100 mg +bisoprolol 2.5 mg
02(group-A)	Male,55	Losartan	Hypertension	Losartan 50mg	Losartan 100mg	Losartan 100mg+bisoprolol 5mg
03(group-A)	Male,52	Losartan	Hypertension	Lorsartan 50mg	Losartan 100mg	Losartan 100mg
04(group-B)	Male,47	metformin	Type-2, diabetes	Metformin 500mg	Metformin 1000mg	Metformin 1000 mg
05(group-B)	Female,45	metformin	Type-2, diabetes	Metformin 500mg	Metformin 500 mg+glibenclamide 5mg	Metformin 1000mg+glibenclamide 5mg
06(group-B)	Male,55	metformin	Type-2, diabetes	Metformin 500 mg	Metformin 1000 mg	Metformin 1000 mg + glibenclamide 5 mg
07(group-C)	Male,45	Theophylline	Asthma	Theophylline 200mg +sometimes inhalar	Theophylline 400 mg +sometimes inhalar(salbutamol)	Theophylline 400 mg + inhalar(regular)
08(group-C)	Female,59	Theophylline	Asthma	Theophylline 200 mg + inhalar	Theophylline 400 mg+ inhalar	Theophylline 400 mg + inhalar+prednisolone
09(group-C)	Male,55	Theophylline	Asthma	Theophylline 400 mg	Theophylline 400mg+inhalar	Theophylline 400mg+inhalar
10(group-C)	Female,61	Theophylline	Asthma	Theophylline 400 mg+sometimes inhalar	Theophylline 400mg+inhalar+prednisolon	Theophylline 400mg+inhalar+prednisolon

The study of the result shows that Non biological drugs are gradually decreases their efficacy and increase the dose for diseases control.

3.2. Biological (Antibiotic) Drug Study

The result of the study shows that the drugs both some biological (only antibiotic or antimicrobial agent) and Non biological drug gradually decrease their efficacy. Biological drugs such as antimicrobial agents, antibiotics are gradually resistance by microorganism. After 20 to 40 years later 60 to 90 percent antibiotics or antimicrobial agents will be resistance by microorganism. Non biological drug could not

2.2. Biological (Antibiotic) Drug Study

2nd group are sub divided into 5 group such as A, B, C, D, E. this 5 sub divided group sample was sent to differents diagnostic centre for culture test (antibiotic resistance test). A group had 2 specimen (A1, A2). A1, A2 urine sample (due to UIT symptom show) was sent to modern diagnostic centre Ltd (Dhaka, Bangladesh), B group had 2 specimen (B1, B2). B1, B2 urine sample (due to UIT symptom show) was sent to meghna laboratory (Chittagong, Bangladesh), C group had 2 specimen (C1, C2). C1, C2 sputum sample (due to RTI symptom show) was sent to chevron diagnostic centre Lmd (Chittagong, Bangladesh), D group had 2 specimen (D1, D2). D1, D2 blood sample (due to several surgical wound infection) was sent to sigma laboratory Ltd (Chittagong, Bangladesh), E group had 2 specimen (E1, E2). E1, E2 blood sample (due to high fever, stomach pain) was sent to CSCR diagnostic centre Ltd (chittagong, Bangladesh) and report was collected and recorded.

bind properly with their specific receptor due to structural change of receptor or decrease the affinity of drug to receptor. After 30 to 40 years later the drug efficacy will be gradually decrease at low level and show low therapeutic effect. At this time the innovative treatment such as gene therapy, stem cell therapy are the more dependable treatment for control or prevent or cure of the diseases. Specific gene therapy used for specific disease control or cure. Manipulation of gene in the human cell and produce protective agent such as protein, antibody, enzyme) which inhibit the growth or kill of the microorganism and also control the hormonal diseases and cellular function and this protective agent such as protein which bind with receptor

(structural change receptor which could not bind with Non biological drug) and give the desire function. On the other hand, stem cell therapy which control the all abnormal cell

such as cancer cell, hormonal disfunction cell etc and prevent the diseases and give the desires cellular function.

Table 2. Antibiotic(biological) drug study and differents antibiotic resistance show.

Specimen no.	Age and sex (male or female)	organism	Resistance drug	Test and specimen location
01(sample-A1)	20,female	Esch. coli	Amoxicillin, cotrimoxazole, cephalixin, cepharadine, ceftriaxone, ceftazidime, ciprofloxacin, nalidixic acid.	Bangladesh
02(sample-A2)	30,male	Esch.coli	Amoxicillin, cephalixin, cotrimoxazole, ciprofloxacin, ampicillin, vancomycin, ceftriaxone	Bangladesh
03(sample-B1)	13,male	Coliform bacteria	Azithromycin, ceftriaxane, cefepime, doxycycline, gentamycin, nitrofurantoin.	Bangladesh
04(sample-B2)	20,male	Coliform bacteria	Vancomycin, chloramphenicol, azithromycin, ceftioxane, doxycycline, gentamycin, nitrofurantoin	Bangladesh
05(sample-C1)	25,female	Staphylococcus aureus	Ampicillin, cloxacillin, vancomycin, tetracyclin, chloramphenicol, methicillin	Bangladesh
06(sample-C2)	30,male	Staphylococcus aureus	Methicillin, ampicillin, erythromycin, cloxacillin, tetracyclin, vancomycin	Bangladesh
07(sample-D1)	35,male	Streptococcus pyogenes	Clindomycin, tetracyclin, erythromycin, chloramphenicol, clarithromycin, cephalixin	Bangladesh
08(sample-D2)	20,female	Streptococcus pyogenes	Tetramycin, clindamycin, erythromycin, clarithromycin, vancomycin, cephalixin, chloramphenicol	Bangladesh
09(sample-E1)	29,male	Salmonella typhi	Ampicillin, amoxicillin, cephalixin, cepharadine, ceftriaxone, cotimoxazole, chloramphenicol, ciprofloxacin, sulphamethoxazole, nalidixic acid,	Bangladesh
10(sample-E2)	32,male	Salmonella typhi	Ampicillin, amoxicillin, cephalixin, cephradine, cotimoxazole, chloramphenicol, sulphamethoxazole, nalidixic acid, oxacillin, clindamycin	bangladesh

The study of the result shows that different antibiotics were resisted by microorganism.

4. Discussion

Non biological drug are synthetic compounds which could not derived from living organism and which bind with receptor, enzyme and show their desire action [9], [10]. The long time use of Non biological drug are gradually decrease their efficacy due to decrease the affinity of drug to receptor or structural change of the receptor and drug could not properly bind with receptor or enzyme and could not show their therapeutic effect [8], [10], [15]. The dose of the drug are gradually increasing day by day, at a certain time the drug will not work properly and does not give their therapeutic effect and do not improve the disease condition [8], [10], [16].

Antibiotic resistance is the ability of microorganism to stop the action of antibiotic and increase the difficulty to treat the infectious diseases [12], [15]. Antibiotic resistance due to the genetic mutation of microorganism, resistance gene transfer one microorganism to another microorganism, misuse of antibiotic, production of enzyme by microorganism [11], [17]. Antibiotic resistance are increasing day by day such as staphylococcus aureus resist the methicillin, penicillin, cloxacillin, erythromycin, tetracyclin, vancomycin and streptococcus pyogene resist the tetracyclin, erythromycin, clindamycin, vancomycin, chloramphenicol and Esch. Coli resist the amoxicillin, cephalixin, ciprofloxacin, nalidixic acid, cephradine, cotrimoxazole and coliform bacteria resist the tetracyclin, ampicillin,

azithromycin, doxycycline, gentamycin and salmonella typhi resist the chloramphenicol, ampicillin, ciprofloxacin, tetracyclin, vancomycin, amoxicillin, cephalixin, cephradine. After 20-30 year later 50-70 percent antibiotic will be resistance and 40-50 year later 70-90 percent antibiotic will be resistance and many people die due to infectious diseases [11], [12], [14], [17].

Gene therapy is the manipulation of the gene into cell and give the desire functional protein (enzyme, antibody, hormone) which control or prevent the diseases such as manipulation of tumor suppression gene which control the tumor or cancer diseases, manipulation of antibody producing gene which inhibit the growth or kill the microorganism [1], [13], [19], [20]. Manipulation of gene can also control all genetic diseases and strong the immune system and control all hormonal diseases [1], [2].

Stem cells have the ability of regeneration of cell such as regeneration of brain cell for the treatment of Parkinson's diseases, Alzheimer's diseases and other brain diseases. Blood stem cell could regeneration of blood cell for the treatment of blood cancer cell [3], [4]. Diabetes patient's could not produce insulin due to the losed of function of insulin producing beta cell and by stem cell therapy, beta cell can be regeneration and produce insulin and control the diabetes disease [6], [7]. Stem cell may be advance in future and control the cellular problem and other diseases [4], [5].

The findings of the study showed that day by day Non biological drug efficacy are gradually decrease and amount of dose gradually increase [8], [10]. At a certain time, Non biological drug could not work in our body and could not give the desire therapeutic action [15], [16]. On the other

hand, day by day antibiotic resistance are gradually increase [12], [14]. At a certain time, antibiotic could not work in our body and could not kill the microorganism and many people dies due to infectious diseases [11], [12]. At this time, the innovative treatment such as gene therapy or stem cell therapy are most dependable treatment for the prevent or control of the diseases condition and safe the life of the people [1], [3], [4], [13].

5. Conclusion

In future Non biological drug will not work properly in our body and antibiotic resistance may be 70-90 percent (30-50 year later) and many people dies due to diseases could not improve [8], [14], [16]. At this time the innovative treatment such as gene therapy or stem cell therapy are most dependable treatment for the treatment of diseases condition [1], [6], [7].

References

- [1] Friedmann T; Roblin R (1972). "Gene Therapy for Human Genetic Disease?". *Science*.175 (4025): 949–955. Bibcode:1972Sci...175..949F.doi:10.1126/science.175.4025.949. PMID 5061866.
- [2] "Human Cloning and Genetic Modification". *Association of Reproductive Health Officials*. 2013. Archived from the original on 18 June 2013.
- [3] Gurtner GC, Callaghan MJ, Longaker MT (2007). "Progress and potential for regenerative medicine". *Annu. Rev. Med.* 58 (1): 299–312. doi:10.1146/annurev.med.58.082405.095329. PMID 17076602.
- [4] Ptaszek LM, Mansour M, Ruskin JN, Chien KR (2012). "Towards regenerative therapy for cardiac disease". *The Lancet*. 379 (9819): 933–942. doi:10.1016/s0140-6736(12)60075-0.
- [5] Malliaras K.; Kreke M.; Marban E. (2011). "The stuttering progress of cell therapy for heart disease". *Clinical pharmacology and therapeutics*. 90 (4): 532–541. doi:10.1038/clpt.2011.175. PMID 21900888.
- [6] Giarratana MC, Kobari L, Lapillonne H, et al. (January 2005). "Ex vivo generation of fully mature human red blood cells from hematopoietic stem cells". *Nat. Biotechnol.* 23 (1): 69–74. doi:10.1038/nbt1047. PMID 15619619.
- [7] Yousef, M; Schannwell, CM; Köstering, M; Zeus, T; Brehm, M; Strauer, BE (16 June 2009). "The BALANCE Study: clinical benefit and long-term outcome after intracoronary autologous bone marrow cell transplantation in patients with acute myocardial infarction". *Journal of the American College of Cardiology*. 53 (24): 2262–9. doi:10.1016/j.jacc.2009.02.051. PMID 19520249.
- [8] Schellekens H., Klinger E., Mühlebach S., Brin J., Storm G., Crommelin D. J. The therapeutic equivalence of complex drugs. *Regul. Toxicol. Pharmacol.* 59, 176–183 (2011).
- [9] Mühlebach S., Vulto A., de Vlieger J. S. B., Weinstein V., Flühmann B., Shah V. P. The authorization of non-biological complex drugs (NBCDs) follow-on versions: specific regulatory and interchangeability rules ahead? *GaBI J.* 2(4), 1–4 (2013).
- [10] Crommelin, D. J., & de Vlieger, J. S. (2015). Epilogue: What Did We Learn? What Can We Expect in the Future? Concluding Remarks and Outstanding Issues. In *Non-Biological Complex Drugs* (pp. 381-388). Springer International Publishing.
- [11] Andersson D, Hughes D (2011). "Persistence of antibiotic resistance in bacterial populations". *FEMS Microbiol Rev.* 35: 901–911. doi:10.1111/j.1574-6976.2011.00289.x.
- [12] "Annual Report of the Chief Medical Officer - Infections and the rise of antimicrobial resistance" (PDF). UK NHS. 2011. Archived from the original (PDF) on 22 June 2013.
- [13] Cavazzana-Calvo, M.; Thrasher, A.; Mavilio, F. (2004). "The future of gene therapy". *Nature*. 427 (6977): 779–781. Bibcode: 2004 Natur.427. 779C. doi:10.1038/427779a.PMID 14985734.
- [14] Levy, Stuart B. (2002-01-01). "Factors impacting on the problem of antibiotic resistance". *Journal of Antimicrobial Chemotherapy*. 49 (1): 25–30. doi:10.1093/jac/49.1.25. ISSN 0305-7453. PMID 11751763.
- [15] Borchard, G., Flühmann, B., & Mühlebach, S. (2012). Nanoparticle iron medicinal products—Requirements for approval of intended copies of non-biological complex drugs (NBCD) and the importance of clinical comparative studies. *Regulatory Toxicology and Pharmacology*, 64(2), 324-328.
- [16] Schellekens H., Klinger E., Mühlebach S., Brin J., Storm G., Crommelin D. J. The therapeutic equivalence of complex drugs. *Regul. Toxicol. Pharmacol.* 59, 176–183 (2011).
- [17] *Biggest Threats - Antibiotic/Antimicrobial Resistance - CDC*". www.cdc.gov. Retrieved 2016-05-05.
- [18] Tacconelli E, De Angelis G, Cataldo MA, Pozzi E, Cauda R (January 2008). "Does antibiotic exposure increase the risk of methicillin-resistant Staphylococcus aureus (MRSA) isolation? A systematic review and meta-analysis". *J. Antimicrob. Chemother.* 61 (1): 26–38. doi:10.1093/jac/dkm416. PMID 17986491. (subscription required).
- [19] Herper, Matthew (26 March 2014) Gene Therapy's Big Comeback *Forbes*. Retrieved 28 April 2014.
- [20] Gene Therapy Clinical Trials Worldwide Database. *The Journal of Gene Medicine*. Wiley (June 2016).