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# Updating Biomedical Studies by Recruiting More Mathematics or Physics-majored Talents

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**Abstract**

Currently, the expense of biomedical scientific investigations is expanding greatly. A great part of these biomedical studies is repeat work and less significance. Mathematics or physics-majored students and talents have a number of unique characters that are very important for biomedical scientific investigations-include disciplinary, good intuitions, sensitive to numbers, higher logic ability of data abstraction/deductions and new model imaginative capability. They can play unique roles in the fields of biomedical science study. In order to update biomedical studies, it is a good way to recruit more mathematics or physics-majored students and talents. This editorial offers our vision on this matter. Possible future achievements are foresighted herein.

**Keywords:** Mathematics; Physics; Systems biology; Drug combination; Origin of life; Human genome; Biology; Medicine; Human genome project; Marine study; Data mining; Next generation sequencing

## Backgrounds

It is well-known that mathematics or physics-majored students are different from biological or medical majored students in many ways and can compliment with one and other. They have a number of unique characters that are very important for biomedical scientific investigations-include disciplinary, good intuition, sensitive to numbers, higher logic ability of data mining, abstraction/deductions and new model imaginative capability. Biological or medical students are, however, advantageous at experimenting and operations yet compromising in number extraction/deduction. They are divided into different groups of scientific talents, even opposite in directions. These two types of students were previously trained for various purposes and utilities. Yet, merging of these different types of talents was called for more recently [1].

## Methodology

### Landscape changes in modern era

Mathematics or physics-majored students become versatile in biomedical fields now. Formerly, Mathematics or physics-majored students and biomedical-majored students are trained for different purposes. In general, parameter details of pathogenesis pathways, pharmacological comparisons and therapeutic efficacy or toxicities quantifications have been changed greatly owing to the dawn of big-data era. As a result, updating present biomedical study model is quite necessary and noteworthy.

The most foundational biological topic of past 25 years is the Human Genome Project (HGP). One decade ago, largest parts of these genetic sequencing are based on labors of biomedical students-electrophoresis-based DNA sequencing. With the advent of Next Generation Sequencing (NGS) human and other bodies of life genomic studies have been changed into computer alignment-based systems [2-3]. For this dramatically methodological change, mathematics or physics-majored students are participating into both DNA drafting and post-genome analysis [4,5]. Large-sized genetic or bioinformatics analysis, data mining, pinpointing and decision-making can be better mastered by mathematic/or physics-majored students and talents. Currently, we may no longer call mathematics or physics-majored student "layman" in biomedical studies. Similarly, theoretic physic-majored students or scholars have been taking parts in scientific investigations of modern biology-systems biology [6].

Modern sciences (including biomedical disciplinary) are entering into big-data era. With the popularity of computers, exponential increase of biomedical data of any experiments and human being diagnostics is waiting for the participants of mathematical or physics-talents. Our suggestion is to encourage mathematic or physic- majored students to take some biomedical curriculum in their university studies. Or at least read some biomedical articles or books in their leisure times.

### Paradigm introductions

Back to early 1950s, DNA double helix theory was discovered by Watson (a biologist from UK) and Crick (a physicist from US). Some years later, Crick alone discovered central dogma of molecular biology. From this paradigm, we can see the importance of joint-efforts between physicists and biomedical scientists. This joint-effort is a magic move that often bring about unexpected outcomes for biomedical science developments and mathematic/computational network progresses.

### Future directions

Currently, a great number of biomedical dilemmas are waiting for the participants and engagements of mathematic/physics-majored students or scholars. These topics are numerous. Several biomedical dilemma that we have raised recently are open for joint-efforts between biomedical and mathematic (especially physics) researchers. They are;

**Anticancer drug combination studies:** Anticancer drug combinations are a good clinical option for advanced malignant managements [7,8]. Since 178 anticancer drugs have been licensed

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worldwide, anticancer drug combination studies are a huge mission by conventional pharmacological ways (equation 1) [9-12]. May mathematical/physical majored scholars give us some more efficiency solutions? Since these efforts are desperately needed to be simplified, this article embraces growing mathematic or computational networks of scientific approaches and advancements.

$$C = (178 \times 177 \times 176)/(1 \times 2 \times 3) = 924176 \quad (1)$$

In real clinical cancer treatment circumstances, useful drugs are more than 178. Many other categories of drugs, such as cardiovascular or other low toxicity assistant drugs may also play key roles in clinical cancer trials and promote cancer chemotherapeutic outcomes. In order to does this job, mathematic or physics brains might be lend or at least play as a chaperon that can greatly facilitate the speed of scientific achievements in many relevant areas by least amount of money and biomedical personnel (highest paid graduate students and experienced technicians) in scientific biomedical studies. Maybe their pieces of advice are gold. In such a complex therapeutic scenario, quick extracting good therapeutic drug combination modular is the top priority currently.

**Pecking order studies for marine life interactions:** Pecking order studies for life evolutions or biological chains are hotspots of scientific studies of both biologists and physicists. Currently, large-scale marine or fresh-water fishery provides a unique platform for promoting the studies of this kind. Accordingly, high quality of marine life pecking order quantifications and interactions may be an important mathematic/physics scholar's job. After mathematic/physics scholar's efforts, our understanding to some interesting topics, such as the origin of life may be enhanced [13-19].

**Data mining in bioinformatics diagnostics, drug therapeutic efficacy predictions and inventions of new generations of therapeutics:** Data mining in bioinformatics diagnostics and drug efficacy predictions is the fastest growing medical discipline in clinical therapeutics, especially on individualized cancer therapies [20-27]. Along with the courses of these research progresses, medical breakthroughs are underway.

**Communication updating and boosts:** Potentially, joint-meetings between biomedical researchers and mathematic/physics talents if available will be greatly beneficial among all scientific circles globally. Among these international activities, co-chairpersons (one biomedical scientists and one mathematical/physics scientists) might be welcome. Only by this design, some highly original work submitted to the meeting organization committee might be found and open to the public. Moreover, joint-authored articles and labs ought to be paid growing attentions and fund supports. Overall, biomedical science may be advanced quicker if we adhere on these types of joint scientific efforts and wider investigations.

## Conclusion

Due to this landscape changes in biomedical studies, some of emerging areas are more suitable for mathematic or physics-majored talents. No matter like or dislike, these students or talents will take growing responsibilities in the fields of biomedical studies. It is a good sign that a lot of researchers with mathematics or physics- backgrounds are coming onto biomedical fields. Hopefully, increasing milestone work will be developed, such as the wonderful cooperation between Watson & Crick. Let's prepare this exciting era as early as possible.

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