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News Letter

Finding Drugs in Unusual Places

Sergiu Fendrihan[1,2,3]*

[1]*Research Development, Institute for Plant Protection Bucharest, Romania*

[2]*University Vasile Goldis Arad, Romania*

[3]*Romanian Bioresource Centre Bucharest, Romania*

***Corresponding Author**: Sergiu Fendrihan, Associated Professor at University Vasile Goldis Arad, Research Institute of Plant Protection, Romania.

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The multiple resistants pathogenic microorganisms are a schoking reality at about 100 years from the discovery of penicillin, which can put an end to the Antibiotic Era. One of the solution are practical organisatoric to sell only prescribed antibiotics (with physician receipt or ordination) and perform every time sensibility test before prescribing. Another method is to use some combinations of antibiotics to can overcomethe resistance effect. Fighting against nosocomial infections is another thing to do. The facts are similary for pathogenic fungi.

An alternative is to find new molecules, new sources of drugs in the nature. The screening of fungi and microbes from environments, which use compounds with antimicrobial/antifungal activity in the relation of concurrence with other microorganisms to defend themseves or competing for resources. Finding them is a tremedous work of many hours, a big investment, a long waiting time to develop, to design, to perform clinical trials and validation until the approval for market is released. Anyway is a necesary work to do in order to have all time new weapons prepared for older and new challenges in infectious diseases and not only.

A good idea is to find new strains of microorganisms in unusual places like extreme environment, which contains unusual microorganisms.

For example from an archean microorganisms *Aciduliprofundum boonei* isolated from deep hydrothermal vent by a group of reseach from the Vanderbilt and Oregon University isolated compounds with antibacterial properties and discovered a gene responsable for it. http://astrobiology.com/2014/11/extremophiles-untapped-source-of-antibacterial-drugs.html

The extremophilic microorganisms can release the so called extremolytes compounds wich can be used as anticancer , anticholesteric, antioxidants drugs [1] and even cosmetic products.

Microbes from polar areas are able–like *Serratia* and *Pseudomonas* related strains are releasing microcins able to fight against G negative and G positive pathogenic microbes [2].

Near us is one of the most interesting source in plants where endophytic strains of microbes and fungi are colonists. In fact, all the macroorganisms animals and plants- have an entire associated external or internal microbiota.

The plants have an –I consider – endo-phyto-microbiome with no pathogenic or dammaging effect on them, instead being neutral or with some abilities favourable for the plants. Its componence and structure depends on the plant species, of age and plant organs, and from others parameters. They practically originated from the soil, and are selected (is a supposition) by the inner environment.

Some of them are able to produce and release sustances with antimicrobial antifungal anticancer and other medical effects. *Actinomycetes* like *Streptomyces, Actinoplanus, Micromonospora* genera have antifungal activity some *Bacillus* endophytic strains release lipopeptides [3]. Strains isolated from Baru (Dipteryx alata) in Brasil, showed activity against *Candida albicans, Escherichia coli* and

Staphylococcus aureus [4]. Souza and coworkers [5], finded over 100 strains of endophytic bacteria, isolated from banana tree (*Musa paradisiaca*) with antifungal activity. New compounds named bafilomycins, from macrolides familly, isolated from *Streptomyces* strains have diverse biological activities, including antitumor, antifungal, antiparasitic and immunosuppressant activities [6]. The endophytic fungi contains too metabolites with antifungal activity like a strains isolated from *Dendrobium* [7]. These are only few examples of findigs of this domain of research.

The consumption of the antibiotics is huge and the tendency is to grow- for example, only China, in the livestock sector, from 15,000 tons consumption in 2010, will needs 30,000 tons. The global antibiotics consumption has growing by 30% between 2000 and 2010, most of them penicillins, cephalosporins and macrolides. About 20 - 50% of them are used inappropriate (data provided by CDDEP-Center for disease dynamics, economics and policy) [8].

Conclusion

The environment shown to be full of surprises for reserchers, and can provide as the necessary drugs for a 10 billions human population in no so distant future, in the conditions of increased incidence proliferative diseases, of infectious emerging diseases with germs resistant to antibiotics and antifungal. The process of research, testing, development, and promotion of a new antibiotic and other medicines is very complicated and some time under restrictions and limitation due to their use, needs high specialised personnel, high costs, but the results can be compensatory (rewarding)? Thats means to design more programs of research including clinical research and trials in that purpose, finding even in un usual places sources of new remedies is a must in the near future.

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