

Editorial

Research

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EDITORIAL

One definition of the word research opines that “Research is to see what others have seen but to think which others have not”. This definition necessitates independent creative thinking by the researcher/investigator. The independent thinking can be expressed in the form of a hypothesis of the investigator. If the hypothesis has ability of predicting the future in a dependable manner, then the hypothesis gets greater acceptability and contributes significantly towards research. Thus research is greatly advanced through such dependable hypothesis from the investigator.

Research is usually conducted on a system. A system may further be composed of two or more sub-systems. The sub-system in turn may be composed of another sub-sub-system and the process may be continued further till the sub-sub-system can be identified in the form of a unit. In addition, a system itself can be considered as a unit. Thus the journey of research starts with a system/unit and ends up with its constituent units (Figure 1). An example of living system can be cited. The unit of living system is a living biological cell. However a living biological cell in itself depends on functioning of micro- and macromolecules in an independent manner. In other words, life is a system dependent on living cells as units; while a living cell is a system dependent on various molecules as units. The cycle goes further till we reach to an easily indestructible atom.

Systems are based on inputs and outputs. Input(s)/output(s) can be one or more. Output of one system can be input of another and so on. Thus systems are more dependent on working of sub-systems through outputs. A coherent system works in synergy such that inputs and outputs of component sub-systems are shared collectively for a sensible, stable outcome of the system. In order to ensure that the research is really effective, complete understanding of the system in the form of inputs, functioning of the system and that of outputs is necessary.

Research in terms of words means Re-search i.e. searching again. Till the time a system is completely understood, re-searching on the same becomes a necessity. It may involve knowing more inputs/outputs, their interdependence or infrastructural functioning of the system itself.

There is thinking in the minds of budding researchers that output(s) of research should be always positive in order to prove effectiveness of research. This is far away from truth. Research is a kind of training and observations are sacrosanct. Interpretation of observations needs creativity. One may look into variables, their effects on outcome and a strict control over variables in

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Submitted: 07 April 2018

Accepted: 10 April 2018

Published: 12 April 2018

ISSN: 2379-089X

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order to ensure consistency in results. If results are inconsistent, either control over variables is not complete or new unknown variables are operative and the system is not fully understood. The habit of manipulating results in order to get desired outcome is as bad as plagiarism. It is more important to be an honest person before being an investigator than being an ‘achiever’ with a doubtful tag.

Thus effective research involves following tips:

- Identify the system thoroughly on which research is to be conducted.
- Know all variables operating on the system.
- Segregate variables into dependent and independent. Dependent variables have interdependence; while independent variables get modified in the form of inputs only.
- Know interrelations between inputs and outputs for all sub-systems.
- Understand grey areas in the system, if any.
- Be very clear about objectives of research.
- Standardise the method of research and ensure consistency.
- If any instruments are being used in the process of research, their thorough understanding is desirable for consistency of results.
- If effect of one single input on output(s) is to be studied, all other remaining variables should be under control in a consistent manner.
- Under such conditions change independent variable in a specific manner and study effect on output for every change in input.
- A system/sub-system is a homogenous unit where internal factors are in equilibrium.
- If input/output of such a system is predictable, only then the system is said to be fully understood.
- When a system is fully understood, variation in inputs can be predictably changed in the form of outputs.

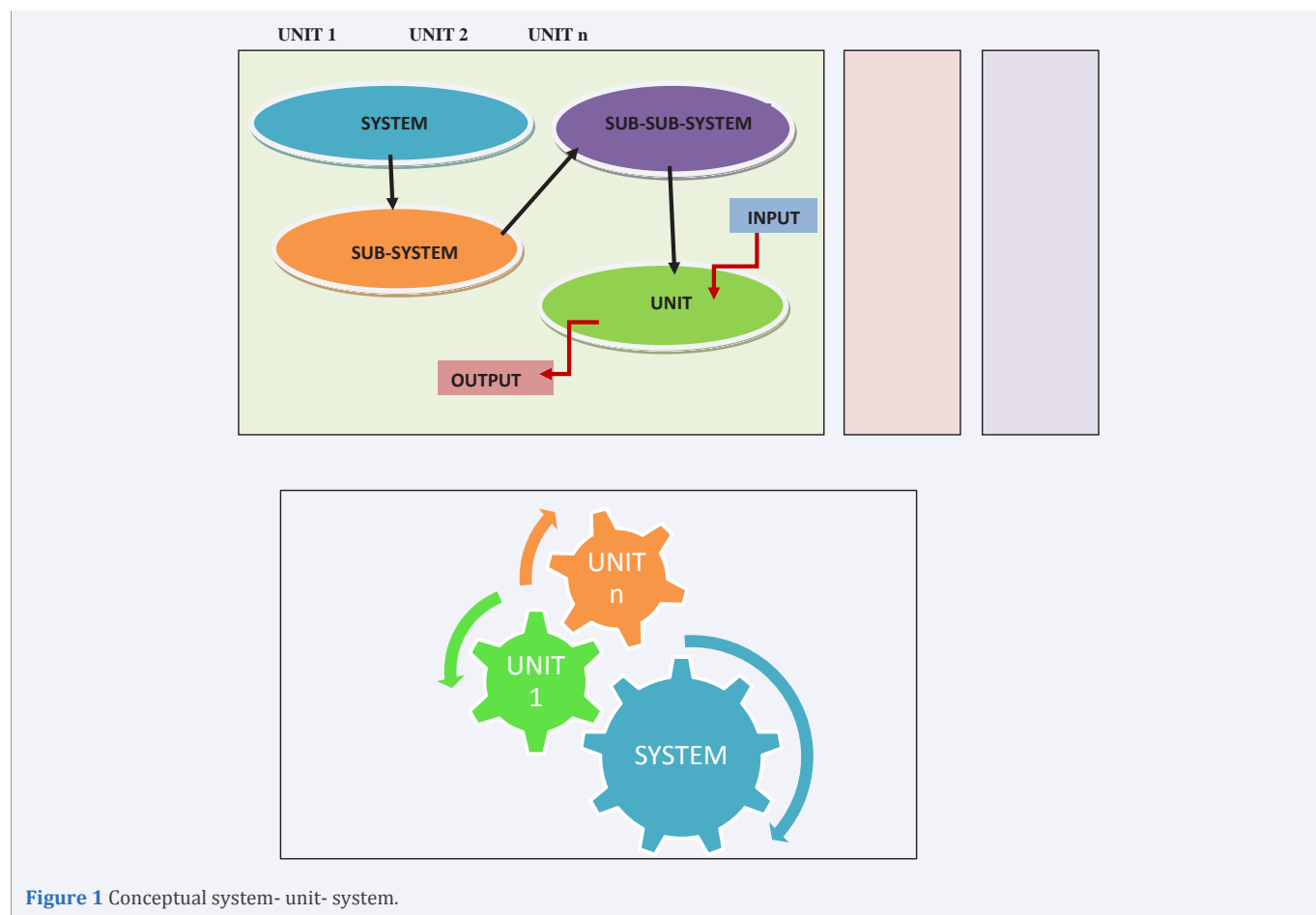


Figure 1 Conceptual system- unit- system.

- Even mathematical predictability in the form of a model is possible for a fully understood system.
 - Simple systems have lesser number of inputs, outputs and variables; and their interdependence is known. In such cases, anatomy of the system is completely understood. In such systems, outputs can be predictable.
 - Complex systems have more number of inputs, outputs and variables; their interrelations are not fully understood and hence predictability is difficult.
 - Life is a complex system. It is open and far away from thermal equilibrium.
 - A physical system is an example of a simple system which in a closed state, is said to be in equilibrium amongst dependent factors.
- The suggestions are not exhaustive but representative. An honest human being is a good beginning for effective research.

Cite this article

Balakrishna SB (2018) Research. J Drug Des Res 5(1): 1066.