Terminology

1- Definition of terminology

Simple Definition of *terminology*

- the special words or phrases that are used in a particular field

Full Definition of *terminology*

1. the technical or special terms used in a business, art, science, or special subject
2. nomenclature as a field of study

Terminology is a science whose aim is to study terms, which are lexical elements used in specialised fields (subjects or their branches) and generated in such fields or modified from elements already existing in other fields.

Terminology allows the compilation, description and presentation of terms.

-**Compilation of terms**: preparation of lists with terms belonging to a certain subject, according to a previously established methodology.
-**Description of terms**: definition or definitions of each term (semantic focus) and description of the elements composing the term and its generation process (morphological focus).
-**Presentation of terms**: preparation of dictionaries.

2- Term and word

In Terminology,
- The "**term**" or "**terminological unit**" is the meaning unit made up of one single word (simple term) or several words (complex term) and represents a concept in a specific semantic field.
From this definition, we can understand that
- A term is a specialized word in relation to its meaning and the field in which it is used. It is considered in that way when used in a certain context in which it takes the function of a **"term".**

Terms can be more or less complex lexical units that are generated following several processes:

-**The extension of the meaning** of a word in the standard language (for instance, "mouse" in computing terminology is a device that allows the user to interact with the computer).

-**Generation** of a phrase that functions as a whole with one specialized meaning (superconducting magnet).

-**Symbolic expressions**, as chemical element symbols (Na) or chemical and mathematical formulas (H2SO4).

-**Abbreviations** (PVC) and **acronyms** (NATO, from North Atlantic Treaty Organization).

-**Names of post** (Prime Minister), organizations or administrations (United Nations, Prime Minister).

3- Characteristics of a term

In order to establish the limit between term and word, it is important to know the characteristics of terms in a specialised language. According to Gutiérrez Rodilla (1998: 88-94) the characteristics of terms are **precision, emotional neutrality** and **stability over time**.

Thus, the term, as with any other word, is a sign with a triple dimension:

• Linguistic: the signifier (the formal aspect of the term).

• Cognitive: the meaning of the concept represented by a term.

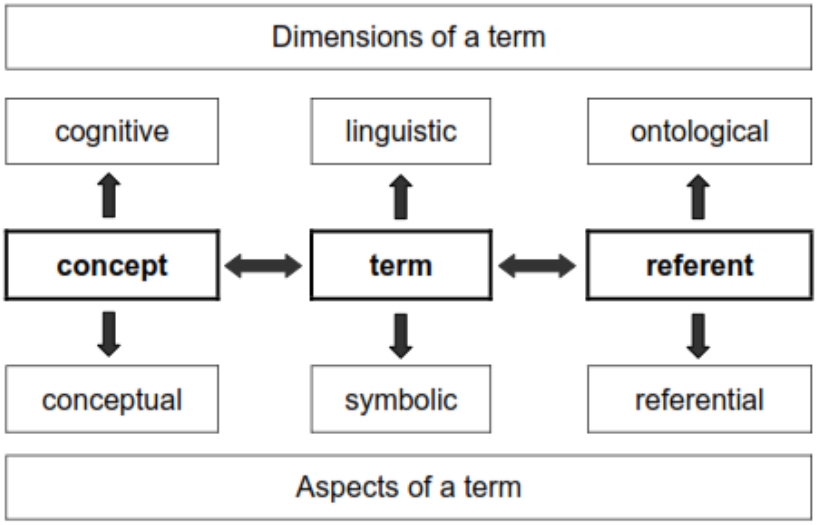
• Ontological: the referent, the object from reality to be named.

The three dimensions give three different, but related, aspects of terms:

• **Linguistic dimension** – symbolic aspect: this refers to a term as a symbol representing an object, a referent.

• **Cognitive dimension** – conceptual aspect: in relation to the concept that allows the human mind to keep the referent.

• **Ontological dimension** – referential aspect: the referent itself to be named and understood.



Application: Biotechnology Glossary

Aerobic

Microorganisms which grow in the presence of oxygen.

Anaerobic

Microrganisms which do not require oxygen to grow and for which oxygen may be toxic. Literally means "life without air."

Anion

A negatively charged particle. If a surface has a positive charge it is called anionic because it can be used to capture negatively charged molecules.

Antibiotic

A chemical substance derivable from a mold, bacterium or synthesized that can kill microorganisms.

Antibodies

Antibodies are proteins (immunoglobulins) synthesized by the immune system in response to an antigen and play an important role in the body's defense against infection. They have a unique shape that enables them to interact specifically with the antigen.

Antigen

A foreign substance (a protein or high molecular weight polysaccharide) which results in the formation of antibodies. Examples are bacteria, viruses, pollen and vaccines.

API

Active Pharmaceutical Ingredient

Autoclave

An instrument used to sterilize equipment and supplies by subjecting them to high pressure saturated steam at 121°C for around 15–30 minutes.

Bacteria

Single-celled or non-cellular spherical, spiral or rod-shaped organisms lacking chlorophyll that reproduce by cell division
(fission).

Bactericide

A substance which destroys bacteria.

Bacteriophage

A virus that exclusively infects bacteria.

Biomass

The total weight of living matter present in a specific area.

Bioreactor

A vessel, usually stainless steel or glass, used for growing mammalian, bacterial, or plant cells. A fermentor.

Cation

A positively charged particle. If a surface has a negative charge it is called cationic because it can

be used to capture positively charged molecules.

CBER (Center for Biologics Evaluation and Research)

Part of the FDA concerned with biologic drugs, particularly with the new protein and peptide drugs developing from biotechnology.

CDER (Center for Drug Evaluation and Research)

Part of the FDA concerned with all small volume parenterals (SVP's), large volume parenterals (LVP's) and non-biological drugs.

Cell Culture

The growth of cells in a vessel such as a flask, spinner bottle, or bioreactor. It is typically used to produce large quantities of cells which express recombinant proteins. Microfiltration is used to sterilize the media and growth enhancers added to media.

cGMP – Current Good Manufacturing Practices

Regulations that describe the methods, equipment, facilities, and controls required for producing: Human pharmaceutical products and veterinary products (21 CFR 210-211); Biologically derived products (21 CFR 600 and 21 CFR 620); Medical devices (21 CFR 820); Processed food (21 CFR 100).

CIP - Clean in Place

A method of cleaning the interior surfaces of pipes, vessels, process equipment, filters and associated fittings, without disassembly by delivering highly turbulent, high flow-rate solution (applies to pipe circuits and some filled equipment); delivering solution as a low-energy spray to fully wet the surface (applies to lightly soiled vessels where a static sprayball may be used); delivering a high energy impinging spray (applies to highly soiled or large diameter vessels where a dynamic spray device may be used). In addition, elevated temperature and chemical detergents are often employed to enhance cleaning effectiveness.

Clinical Trials

Required testing as part of drug development to study the safety and efficacy of new drugs in human

subjects prior to the drug's approval by the FDA.

Cold Sterilization

Removal of all bacteria by filtration through a sterilizing grade 0.2 µ filter.

Colony Forming Unit

A measure of viable bacterial or fungal numbers. The results are given as CFU/mL (colony-forming units per milliliter) for liquids orCFU/g (colony-forming units per gram) for solids.

Cytotoxic

Substance that is toxic to cells or is cell-killing.

Cytotoxicity Test

Part of USP Class VI testing designed to determine the biological reactivity of mammalian cell cultures following contact with specific extracts prepared from the material under test

DMF (Drug Master File)

A document submitted to the FDA that explains the formulation of an active ingredient or component of the manufacturing process and is referenced in an Investigational New Drug (IND), New Drug Application (NDA), or Amendment to New Drug Application (ANDA) from a company.

***E. coli (Escherichia coli*)**

A bacterium commonly used in recombinant DNA technology. Occurs naturally in the human intestine.

Endotoxin

A structural component (lipopolysaccharide) of the cell wall of gram negative bacteria. When the integrity of the wall is disturbed, through cell division, growth and death, endotoxins may be released into the product. Endotoxins must be controlled in parenteral products as they may result in a fever reaction in mammalian systems.

FDA

U.S. Food and Drug Administration.

Fermentation

The process of growing microorganisms within an enclosed tank (fermentor) under controlled conditions. It is necessary to provide aeration, and agitation as well as control temperature, pH, and carbon/nitrogen sources.

Generic Drug

A drug product produced and marketed under its chemical or common name after a proprietary drug goes off patent (17 years). Generic drugs are typically less expensive but must still meet the stringent standards as specified by the FDA.

Gram Stain

A basic technique used for the classification of bacteria where an organism that retains a crystal violet stain is considered gram positive and organisms that exhibit only the counterstain are gram negative.

Heat Labile

Pharmaceuticals that are able to be destroyed by high temperature and must be sterilized by filtration.

In Situ

Sterilization or integrity testing of a filter in the system rather than removing it and performing the operation in an autoclave or separate integrity test stand. Derived from Latin meaning "in place".

In Vitro

An experiment performed outside or isolated from the living organism. Literally means "in glass".

In Vivo

An experiment performed using a living organism. Literally means "in life".

Integrity Test

A test to ensure that a filter is intact and will function to the standards established by the

manufacturer. There are three typical integrity tests used : Forward Flow Test (diffusive flow) , Bubble Point test, and the Pressure Hold test. Integrity tests on sterilizing grade filters are correlated with bacterial challenge data.

Intermediate

An organic compound that is formed in a stage of production of an active pharmaceutical ingredient. It is often the active portion (see API) of the final drug product or a critical component of in the pathway to the final product.

Lipids

Any numerous fats and fat-like materials that are insoluble in water but are soluble in common organic solvents.

Lysis/Lyse

Destruction of a cell and the release of its contents by disrupting the cell wall by using various agents such as detergents or enzymes. It is often necessary in fermentation processes that produce intracellular recombinant proteins.

Microbe /Microorganisms

Typically refers to single-celled organisms such as bacteria, protozoans, yeast, viruses or algae.

Mycoplasma

A class of microorganisms without cell walls and are deformable. They have been shown to be capable of penetrating a

0.2 micron sterilizing grade membrane and require a 0.1 micron for complete retention.

NF (National Formulary)

A compendium of purity and testing criteria for chemicals and usually published in combination with the USP.

Nutraceuticals

A composite of food and pharmaceuticals. A class of foodstuff (as a fortified food or dietary

supplement) that provides health benefits.

Parenteral Drug (LVP, SVP)

A drug that is infused (IV) or injected (IM or subcutaneous) into the human body.

Purified Water, USP

A pharmaceutical grade of water produced by distillation, reverse osmosis or deionization. Typical uses are to rinse equipment, vials and ampoules, and as base for cosmetics and oral drugs. It is not used as raw material for parental drugs.

***Saccharomyces cerevisiae* (Baker's Yeast)**

A strain of yeast used in fermentation of wines and beers and during the validation of 0.65 micron membrane filters.

Sanitization, Sanitize

A process to make sanitary or hygienic in order to reduce the possibility of growth and spread of pathogenic organisms. Common sanitization agents include bleach, peracetic acid and hydrogen peroxide.

Serratia marcescens

A bacterium used for defining and validating 0.45 micron removal rated filters.

Sterile Water for Injection, USP

Same as WFI, but sterile packaged.

Sterilize

A process that eliminates or kills all forms of microbial life including fungi, bacteria and viruses that can be present on a surface, contained in a fluid or in pharmaceutical preparations, or in a compound such as biological culture media. Sterilization can be achieved by applying the combinations of heat, chemicals, irradiation, high pressure, and filtration.

Sterilizing Filter

A filter that produces an effluent in which no microorganisms are demonstrable when tested by the method specified in the current edition of the United States Pharmacopoeia. The filter is challenged with a specified microorganism at $10^7/cm^2$. Usually accepted as 0.2 µm absolute pore-size rating.

Vent Filter

A filter intended to separate the liquid contents of a vessel (tank, fermentor, bioreactor) as well as its vapors and gas from the ambient air. Prevents the passage of microorganisms and liquid while allowing the passage of gases. Best accomplished by the use of hydrophobic media such a PTFE.

Virus

Simple life form that invades living cells and uses their chemical machinery to keep itself alive and to replicate itself.

Water Intrusion Test (WIT)

An in-situ integrity test for hydrophobic filters. The WIT measures the decay rate of a pressure level imposed upon a hydrophobic membrane enveloped in water.

WFI (Water-For-Injection)

Water purified by distillation or reverse osmosis and containing no added substances. It must meet the purity requirements for USP Purified Water with a pH between 5 and 7, total dissolved solids (TDS) less than 10 ppm, passes USP test for oxidizables and pass the USP endotoxin test.

Yeast

Any of various unicellular fungi of the genus Saccharomyces

Scientific Article

What is a scientific article?

- A scientific article is a piece of writing that reports the findings of a scientific experiment.
- A scientific paper is a written and published report describing original research results.
- Scientists use these types of articles to inform other scientists, as well as regular people, about their discoveries.
- A good scientific article does several things: It explains **why** the experiment was done, **how** it was performed, **what** conclusion was reached, and **how** the results support that conclusion.
- The purpose of a scientific writing is to communicate new scientific findings..
- It should be clear, simple and well ordered communication to transmit new scientific findings.
- Scientific article must use proper English which gives the sense in the fewest short words.

Why we read a scientific article?

I read research papers because of:

- **The Content:**

  Looking for new ideas or new proof techniques to write a new paper.

- **The Topic:**

  What are the new directions in my field or learning a new topic.

- **The Authors:**

  Looking for valuable colleagues to work with or new comers.

The typical "anatomy" of a scientific article:

- Title and authors
- Abstract/summary
- Introduction
- Materials and Methods
- Results
- Discussion

- Acknowledgements
- References
- Figures/Tables

Title and authors

- Title is very descriptive (often states the main finding) and is not about being creative and "catchy"!
- Order of authors is important. What can you tell from it?

Abstract

- Brief background of subject
- Purpose of the study
- Major findings of the study
- Relationship between these findings and the field

How to approach the introduction?

- What is the accepted state of knowledge?
- What data led directly to the work of this paper?
- What is the hypothesis being tested?
- What are the basic conclusions? (Scientists don't really like surprise endings and this is usually stated in the last paragraph.)

Materials and Methods

- Should be detailed enough for another scientist to replicate the work (volumes, times, company material was purchased from etc.)

Results

- While the introduction poses the questions being asked, the results describes the outcome of the experiments that were done to answer the questions.
- Results are often simply stated with *interpretation* of them coming later in the discussion.
- Figures and tables allow the reader to see the outcomes of the experiments for themselves!

Discussion

- Data is analyzed to show what the authors believe the data show. (You don't have to agree with their interpretations!)
- Findings are related to other findings in the field (contribute to knowledge, correct errors, etc.)

- How is this work significant?

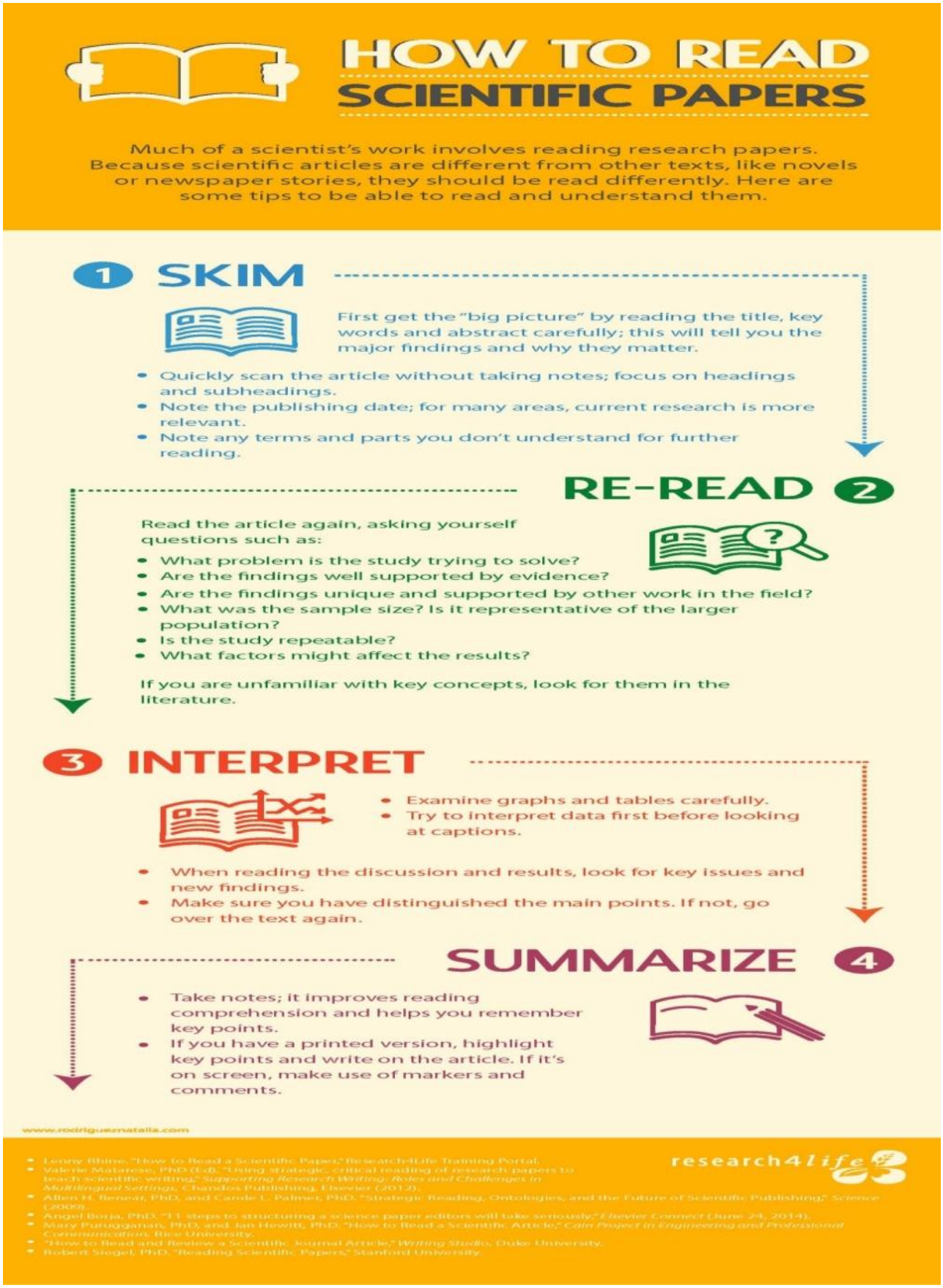
Acknowledgements

- Thank people who contributed materials.
- Thank people who contributed technically but maybe not intellectually (would not be authors).

References

- Papers cited in the text
- What parts of the paper cite other papers?
    - Introduction
    - Materials and Methods
    - Discussion
    - (Maybe a few in Results)

Question1: How should we READ a scientific paper?



Application

Example of a scientific article

ELSEVIER

Bioresource Technology 67 (1999) 201–203

BIORESOURCE TECHNOLOGY

Short Communication

The production of alkaline protease by a *Bacillus* species isolate

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Abstract

Alkalophilic bacterial strains (52) isolated from saline-alkali soils were screened on milk agar medium for their ability to produce alkaline protease. Fifteen positive isolates were further examined for their extent of alkaline protease production. The most potent producer was identified as *Bacillus* sp. Maximum enzyme activity was achieved in the presence of glucose (1% w/v) and ammonium chloride (1% w/v) at pH 10.5 and 40°C over a 20 h incubation. © 1998 Elsevier Science Ltd. All rights reserved.

Keywords: Alkaline protease; *Bacillus* sp.; Alkalophiles

1. Introduction

Proteases are the most important industrial enzymes, accounting for about 60% of the total enzyme market (Ng & Kenealy, 1986). Alkaline proteases are of particular interest due to their wide applications in detergent, tanning and dairy industries (Grebeskova et al., 1988; Wilson et al., 1992; Phadatare et al., 1993). Of late, some newer applications, for instance recovery of silver from photographic plates (Fujiwara et al., 1991) and peptide synthesis (Cerovsky, 1992), have also been explored. In view of the commercial interest, microbes from varied habitats have been examined by many researchers for industrially-suitable alkaline proteases (Steele et al., 1992; Sen & Satyanarayana, 1993; Paliwal et al., 1994; Gajju et al., 1996).

In the present work the authors attempted to isolate bacteria from saline-alkali soils and optimized conditions for maximum alkaline protease production by a promising strain.

2. Methods

2.1. Isolation and screening

Fifty-two alkalotrophic bacterial strains were isolated, employing an enrichment culture technique (Boyer et al., 1973), from saline-alkali soils of the Avadh region in Uttar Pradesh, India. All the strains were screened for their alkaline protease production on milk agar medium containing (g/l): skimmed milk, 100; yeast extract, 10; agar, 20; pH 8.0 (adjusted after autoclaving). Fifteen isolates found positive for alkaline protease were again tested for their enzyme production in the growth medium containing (g/l): glucose, 10; peptone, 5; yeast extract, 5; KH_2PO_4, 1; $MgSO_4.7H_2O$, 0.2. The pH of the broth was adjusted to 10.0 after autoclaving by adding sterilized Na_2CO_3 solution (20% w/v) at 10% (v/v). The above medium (50 ml) was inoculated at 1.0% (v/v) with a 24 h old (O.D. 0.6) culture and incubated at 37°C in a shaker (120 rev/min) for 18 h. The grown cultures were then centrifuged at

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How to summarize an article?

How to analyze an article?

Write and present a scientific article in English

IMRAD Story (Introduction, Methods, Results and Discussion)

- **I** = Introduction, what question (problem) was studied.
- **M** = Methods, how was the problem studied.
- **R** = Results, what are the findings.
- **A** = and
- **D** = Discussion, what do these findings mean.

Some important <u>Language</u> points

- Poor experimentation cannot be masked by brilliant writing; however, poor writing can mask brilliant experimentation.
- Avoid complex sentence structure.
- Use simple and clear English.
- Always keep in mind that the paragraph is the essential unit of thought.