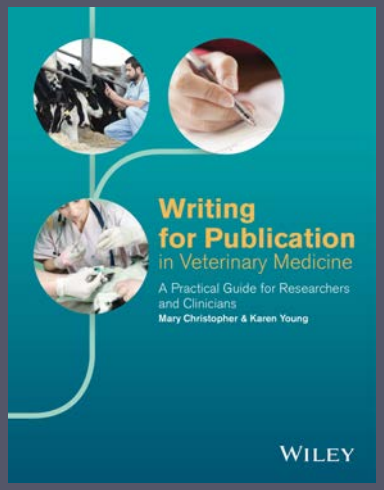
Writing for Publication in Veterinary Medicine: Keys to Success

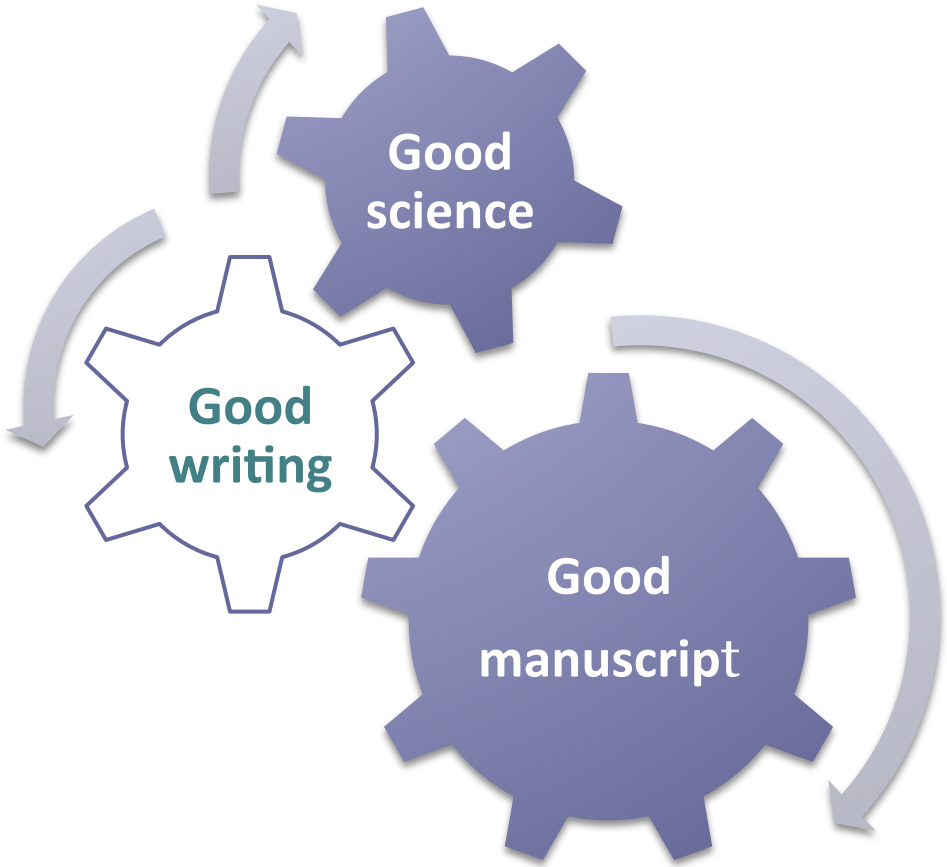


Mary M. Christopher, DVM, PhD
University of California-Davis

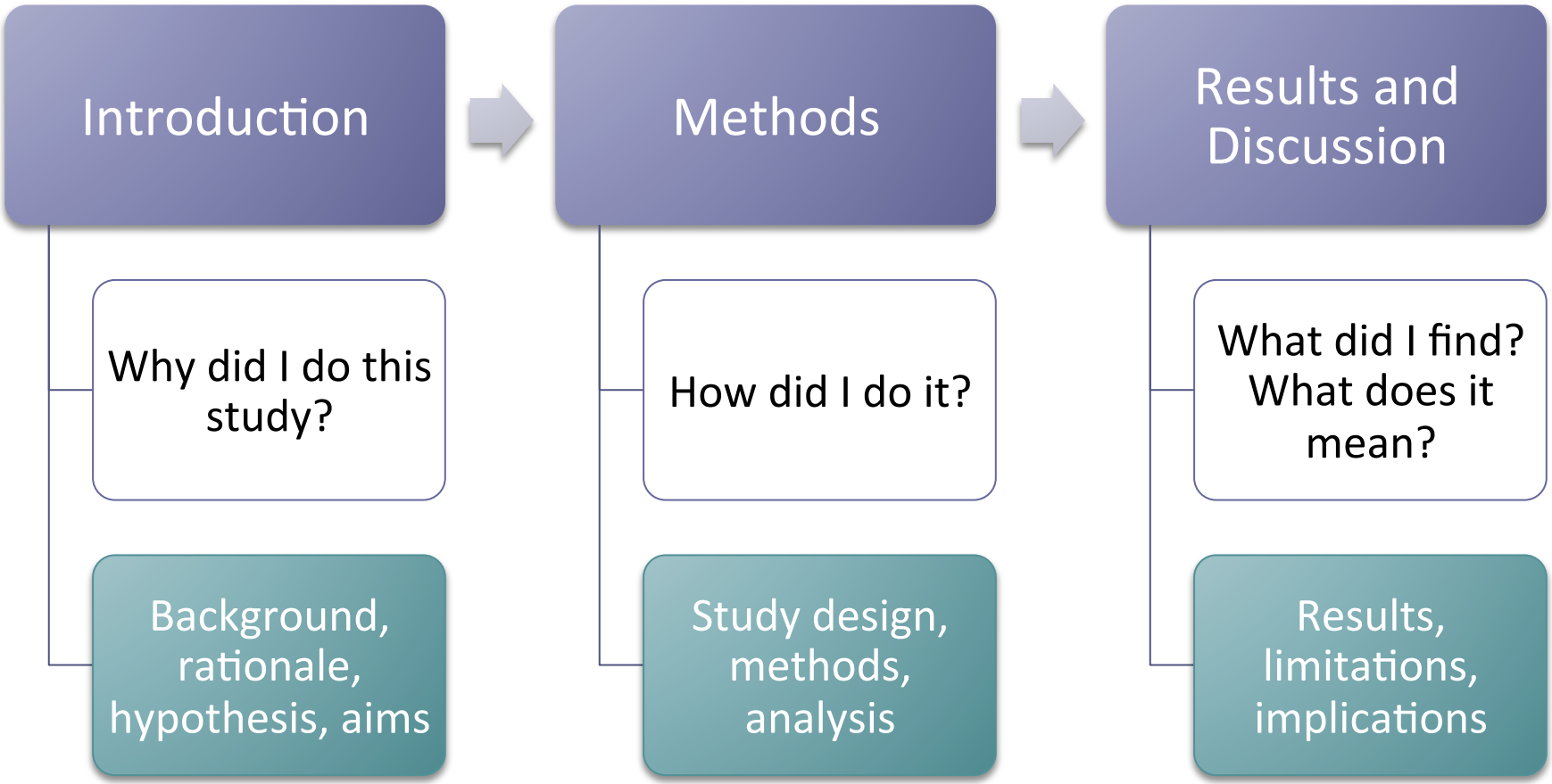
Karen M. Young, VMD, PhD
University of Wisconsin-Madison

FREE at http://www.wiley.com/legacy/wileyblackwell/gmspdfs/VETWritingforPub/#/1/

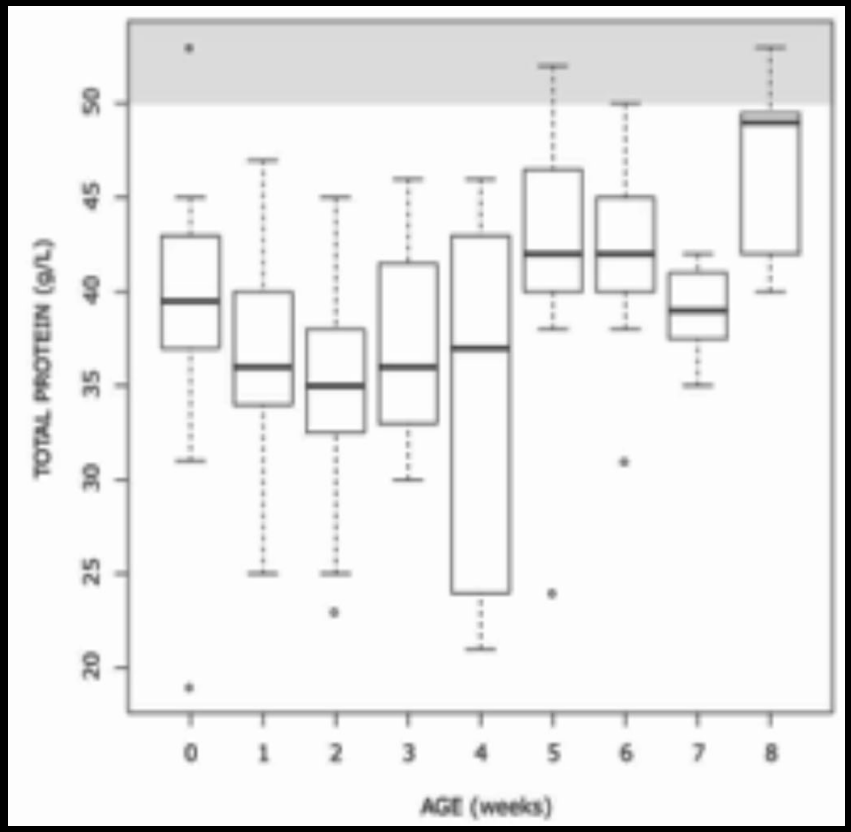
Writing for publication: keys to success



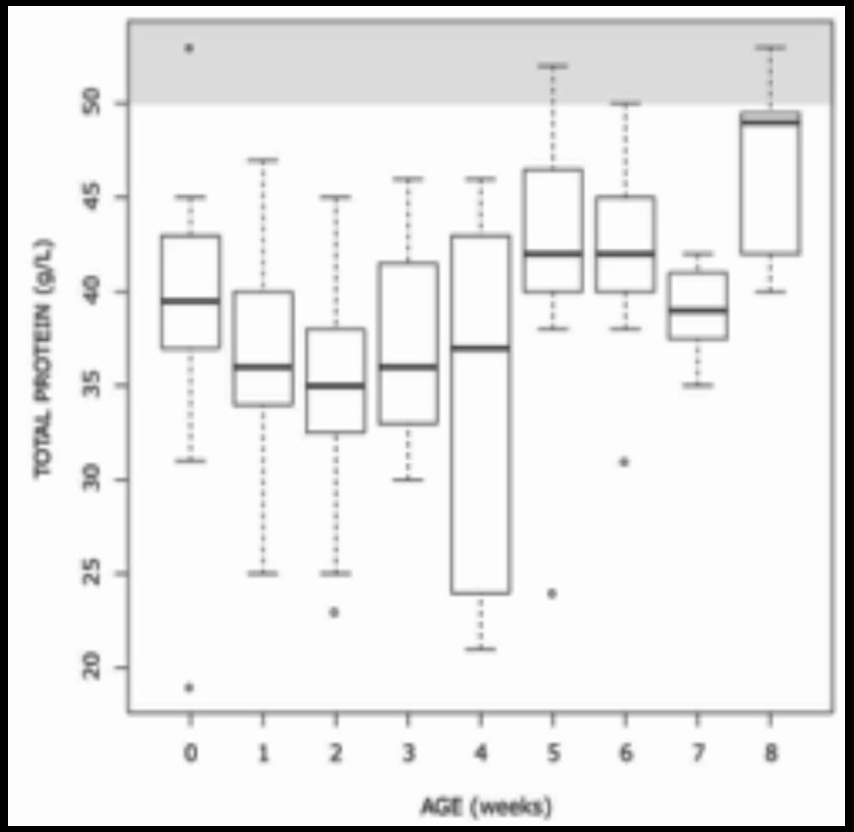
Begin with the research study



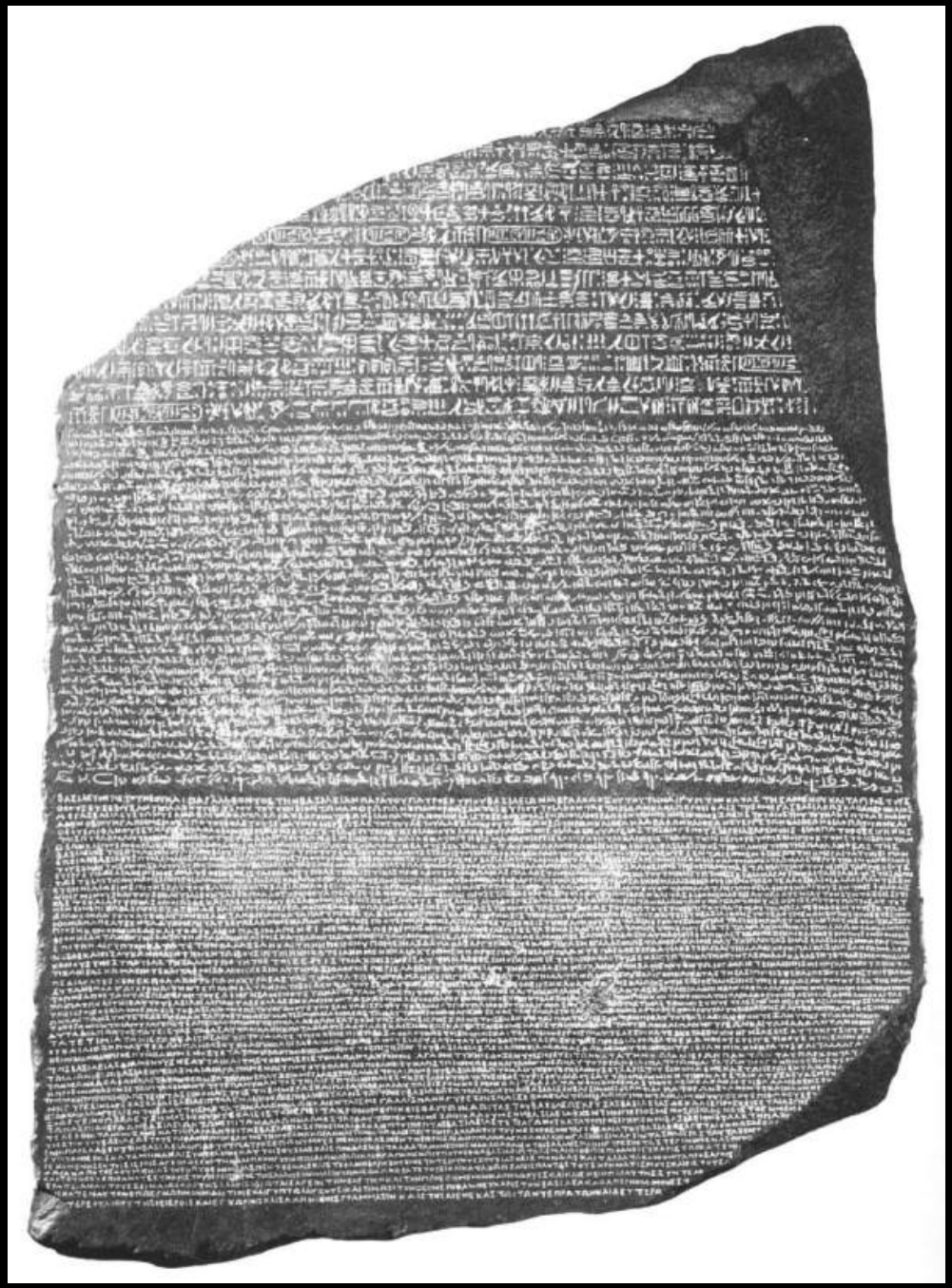
What is it you want to say?



What is the main message?



Serum total protein concentrations are lower in werewolf cubs than in adults.



Be absolutely clear about your main message

What is it you want to say?

To whom do want to say it?

Selecting a Journal

Aims and scope

Is your manuscript within the scope of the journal?

Target audience

Whom do you wish to reach?
General practitioners?
Clinical specialists?
Researchers?

Article types

Does the journal publish your article type, e.g., a case report?

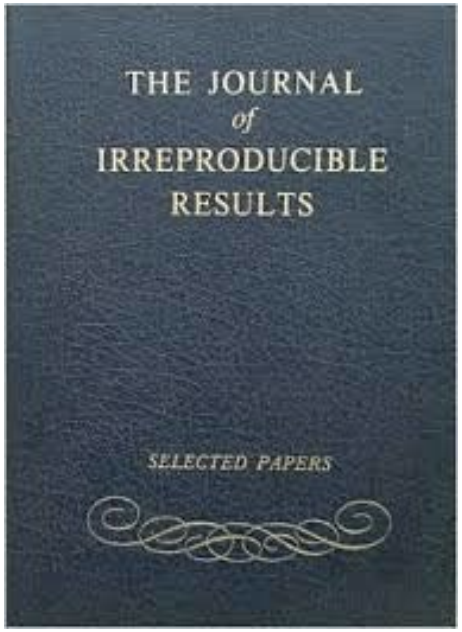
Geographic focus

Does your article appeal to a broad geographic audience?

Language

Does your target audience read English?

Visibility and Access



Indexing

Is the journal indexed? Where?

Online publication

Is the journal published online?

Access to articles

Is a journal subscription required to access your article?

Quality and Prestige

Editorial board

Who are the editorial board members?
Are they recognized experts in the field?

Authors

Who publishes in the journal?

Reporting guidelines

What are the journal's requirements for conducting and reporting clinical trials, studies of diagnostic accuracy, and other types of studies?

Ethical policies

What are the journal's requirements for reporting on the ethical care and use of animals and for human subjects research?

Metrics and Ranking

Rejection rate

What percentage of submitted manuscripts is rejected?

Impact Factor

Where does the journal rank among similar journals?

What is the journal's scientific impact based on available metrics?

Practical Aspects

Submission process

Is your manuscript submitted online and can you track its progress through the peer-review process?

Time to publication

What is the average time from submission to acceptance?

From acceptance to publication?

Publication costs

Are there submission or publication costs?

Beware the predatory journal

- Be sure the publisher is reputable
  - Full verifiable contact information, including address?
  - Editorial Board: recognized experts/affiliations?
  - Peer review process: described?
  - Member of the Directory of Open Access Journals or similar association?
  - Are articles assigned a DOI?

After selecting a journal

- READ the Author Guidelines for that journal
  - Follow guidelines explicitly
  - Read them again before submitting your manuscript
  - Some guidelines include word limits

PAY ATTENTION TO DETAIL

The structure of a manuscript

Introduction	Why did I do this study?
Methods	How did I do it?
Results	What did I find?
and	
Discussion	What does it mean?

Why is structure so important?

- For writers: a framework helps organize ideas and information
- For readers: predictable patterns and relation-ships aid comprehension
  - Helps readers find information
  - Helps readers draw conclusions

The structure of a manuscript

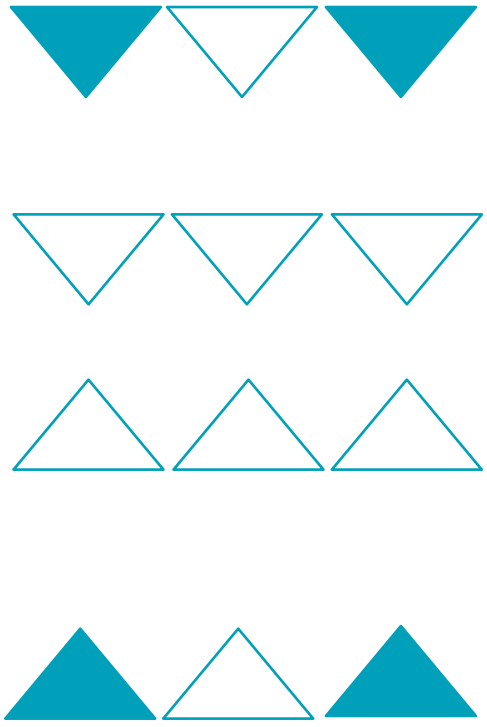
Introduction

Methods

Results

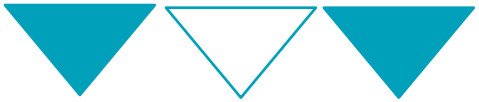
and

Discussion



Make sure the readers know where they are, where they are going, and why

Introduction

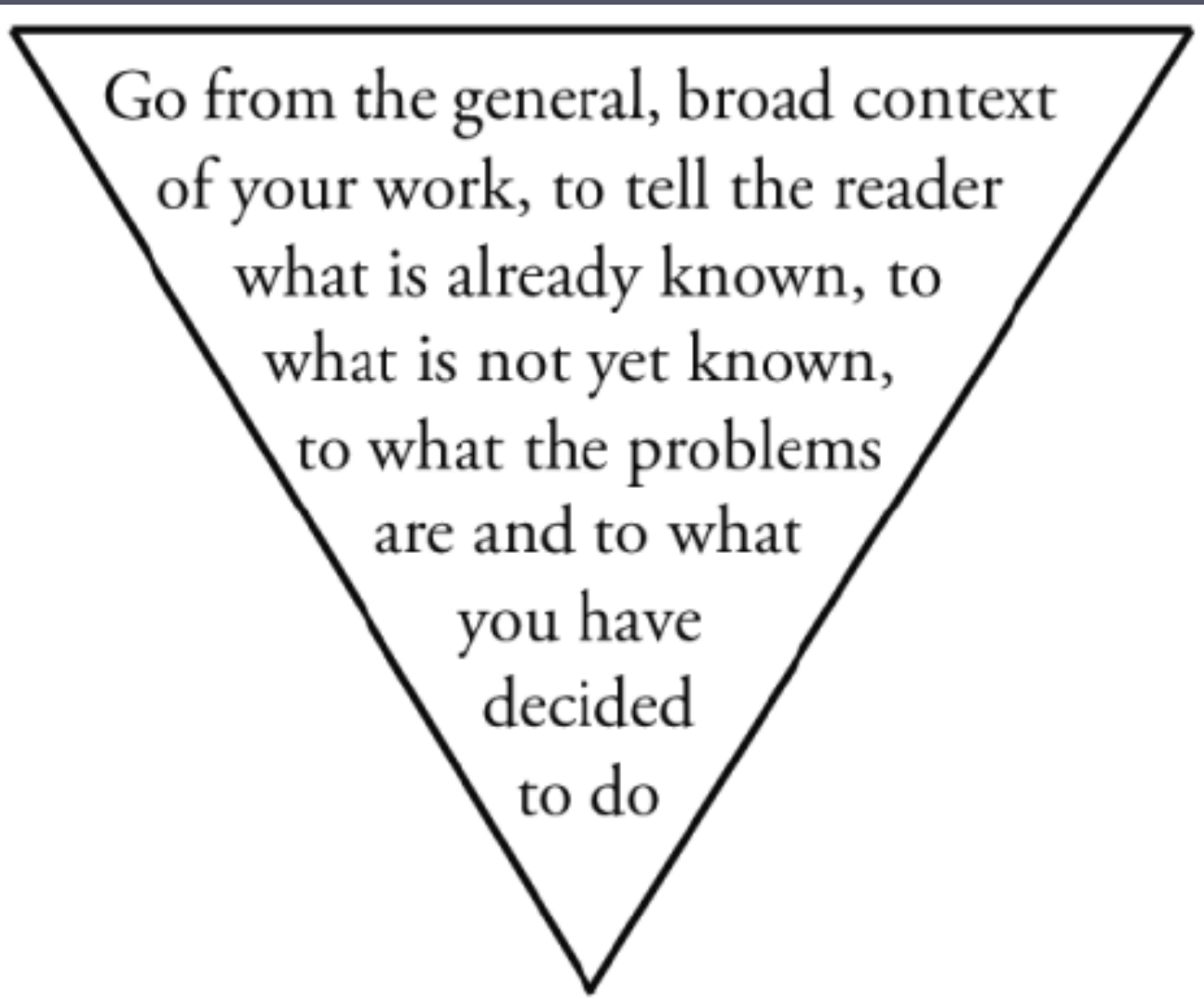


- Why did you do this study and what did you decide to do?

A persuasive argument that builds a compelling rationale for your study.

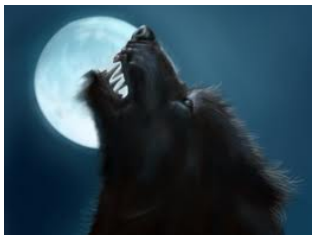
Why should the reader care?
Write an interesting first sentence!

The Introduction



Introduction, first paragraph

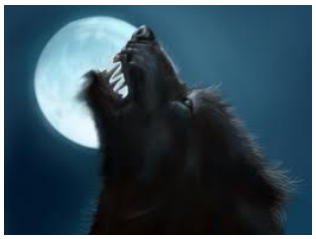
- Why did you do the study?
  - Why is the subject important and what is known?
  - What are the gaps, questions, or problems that warrant this study?



Page 6: read the Introduction

Did the authors catch your attention?

Mortality in neonatal werewolves results from both infectious and noninfectious causes, including malnutrition, maternal aggression, bacteremia, and congenital defects.[1-8]



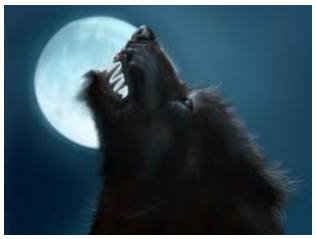
Did the authors catch your attention?

Mortality in neonatal werewolves results from both infectious and noninfectious causes, including malnutrition, maternal aggression, bacteremia, and congenital defects.[1-8]

Mortality rates in neonatal werewolf cubs range from 12% to 30% and have not improved in the last 100 years.

Why is the topic important and what is known?

- Mortality rates are high (12-30%) and have not improved in last 100 years
- Clinical signs of illness are nonspecific, so diagnosis is challenging
- Biochemical testing could improve diagnosis of neonatal disorders such as hypoglycemia

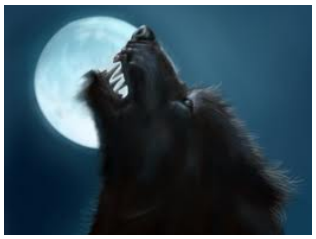


Why is the topic important and what is known?

- Mortality rates are high (12-30%) and have not improved in last 100 years
- Clinical signs of illness are nonspecific, so diagnosis is challenging
- Biochemical testing could improve diagnosis of neonatal disorders such as hypoglycemia

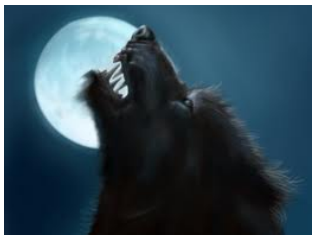
What are the gaps, questions, controversies?

- Limited knowledge of biochemical physiology
- Previous studies used obsolete methods or had limited sample sizes and ages



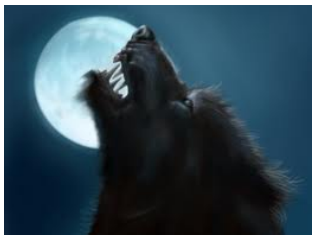
Introduction, last paragraph

- What did you decide to do?
  - What are your hypothesis and specific aims?
  - How will your approach challenge, expand, or improve on existing knowledge?



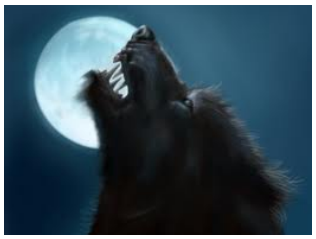
Introduction, last paragraph

The aims of this study were to evaluate physiologic changes in plasma glucose and total protein concentrations in werewolf cubs from birth to 8 weeks of age and to compare the results with values from adult werewolves.



Introduction, last paragraph

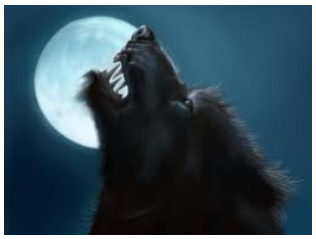
We hypothesized that glucose and protein values in neonatal werewolves would differ significantly by age and from adult values.



How will the authors' approach challenge, expand, or improve on existing knowledge?

"Close the circle"

by adding a new sentence to the end of the Introduction (on page 7)



Mortality rates in neonatal werewolf cubs range from 12% to 30%, and have not improved in the last 100 years.[1,2] Clinical signs of illness are often nonspecific, so diagnosis can be challenging to practitioners.[3]

"The results of this study will add to our understanding of biochemical physiology in neonatal werewolves and identify the need for age-specific reference intervals that could facilitate disease diagnosis and reduce mortality."

Are the references appropriate?

- Avoid ‘junk’ citations
  - …diagnosis is challenging for clinicians.[2-8]
- Limit non-peer reviewed sources
  - Textbooks (limit)
  - Review articles (be selective)
  - Proceedings (avoid)
- Relevant and evidence-based

Keys to INTRODUCTION

- Go from broad to focused
- Don’t write a literature review
- Advance an compelling argument for the study
- Make sure the objectives/specific aims address the research question (and correspond to what you did in the study)
- Cite relevant, peer-reviewed literature

Methods

- How did the authors test the hypothesis and achieve their objectives? What did they do?

- Logical order and sufficient detail

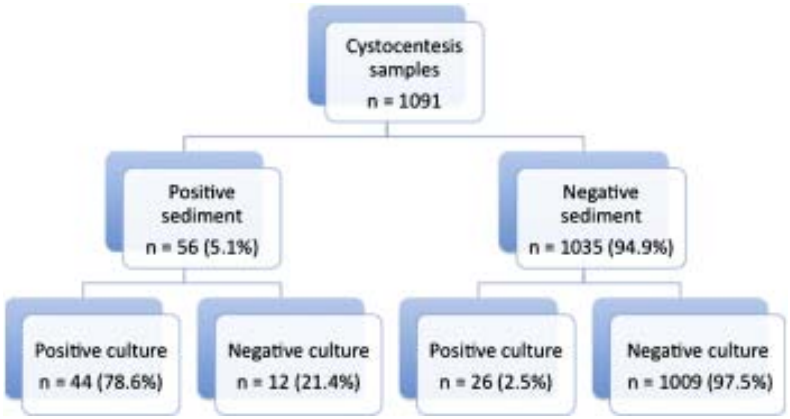
  Could someone replicate your study based on the details provided?

Methods

- Study design (based on hypothesis and objectives)
  - Retrospective or prospective
  - Randomized clinical trial, cohort study
  - Reporting guidelines, eg, STARD guidelines
  - When and where study conducted

Methods: logical and orderly flow

- Use flowcharts
  - Effectively illustrate groups, treatments, stratification
  - Simple and easy to understand
- Use subheaders



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Methods

- Study population, animal patient selection, inclusion/exclusion criteria
  - Randomization method, if applicable
  - Study period
  - Species, breed, age, sex, body weight
  - Definition of “health”
  - Housing/capture
  - Guidelines for humane/ethical animal care and use

Methods

- Provide details of specimen collection, handling, analysis
  - Timing, fasting status, venipuncture site, volume collected, tube(s) used
  - Storage (duration & temperature)
- Clearly define scoring system or subjective analysis
  - Who? Qualifications? Blinded?

Methods

- Analytical methods
  - Standard/unmodified methods: cite references
  - Provide brand, manufacturer name and location, source of instruments, products
  - Assays
    - Generation
    - Performance characteristics

Methods

- Statistical analysis
  - Details, as well as software used: can someone else use your data to verify results?
  - Define terms, variables, tests, including tests for normality
  - Definition of statistical significance (alpha value)
  - Indicators of variance, uncertainty, including CI

Animals

Thirty healthy cub werewolves born to 7 shewolves were enrolled in this study. One female gave birth to 11 cubs (4 males and 7 females) and 6 females gave birth, respectively, to 1, 7, 1, 1, 4, and 5 cubs in the same litter (7 males and 12 females). Cubs were weaned at approximately 8 weeks of age.[6] At age 6 weeks, the cubs were fed with certified werewolf chow. Water was provided ad libitum.

Blood sample collection

A sample of 1 mL for each cub was determined to be the amount needed to allow for analysis, loss, dead space, and repeats and to be a safe amount based on the blood volume of a cub.[7] Blood was collected every week from birth to 8 weeks and was placed in heparin tubes. Only cubs considered healthy were sampled.

Questions

Are sufficient details provided so aims can be achieved and others could replicate study?

- What were the inclusion and exclusion criteria? Report numbers of cubs actually included in the Results.
- When were specimens collected and was the time uniform throughout the study? Were cubs fasted before collection?
- Was serum or plasma used? What salt of heparin was used in the tubes? Manufacturer and location? Centrifugation: report *g* force, not rpm.
- Are analyzers – and the methods used – reported?
- How were outliers identified? What exclusion criteria were established for specimens?

Questions

Statistical analysis

- What is the source of adult reference intervals?
- Are statistical tests appropriate?

References

- Are the references necessary?

  Only references needed: amount of blood that can be collected safely from a cub, Reference Value Advisor, recommended procedure for outlier detection

Revised methods

Animals

This prospective cohort study was conducted in the Division of Clinical Pathology, Faculty of Veterinary Medicine, Shapeshift University. Cubs born to privately owned shewolves from January to March 2012 were enrolled in the study with informed consent of the owners and with an approved animal care and use protocol from Shapeshift University. Cubs were housed with their mothers in a clean enclosed space in the homes of the owners. Criteria for inclusion were that the cubs were clinically healthy based on physical examination, nursing behavior, and activity level and weighed at least 200 g. At age 6 weeks, the cubs were fed certified cub werewolf chow (Brand, Manufacturer, City, Country), and were weaned at 8 weeks. Water was provided ad libitum, and cubs were not fasted at any time during the study.

Revised methods

Blood collection

Blood was collected weekly on days 0 (birth), 7, 14, 21, 28, 35, 42, 49, and 56 between 8:00 and 9:00 am. From each cub, 1 mL was collected from the jugular vein, alternating the jugular veins each week, using a 2-mL sterile syringe with a 23-ga needle and placed in lithium heparin tubes (Brand, Manufacturer, City, Country). A volume of 1 mL for each cub was determined to be the amount needed to allow for analysis, loss, dead space, and repeats and to be a safe amount based on the blood volume of a cub.[6] Blood tubes were placed in an ice-chilled Styrofoam, protected from direct contact with ice, and delivered to the Division of Clinical Pathology within 1 hour of collection.

Keys to METHODS

- Describe what you did in an orderly way
- Provide details so that informed readers/ investigators can:
  - Replicate the study
  - Judge the validity and generalizability of the study

Results

- What were your findings?
  - Just the facts
  - Save interpretation and context for discussion

Results

- Present results in logical order in parallel with methods
- Use text to report simple data and to summarize, but not repeat, detailed data found in tables and figures
- Do not interpret data

Numerical results

- Use appropriate significant digits
- Use full stop/period for a decimal point
- Do not report percentages alone (also include the absolute numbers)
- Statistics: *P* value, test used

Critically analyze the Results section

What were the findings? (See figure and table, p. 15)

- How many cubs of each breed were included and excluded? Were some specimens excluded?
- Are results presented logically and in the same order as detailed in the Methods section?
- Is text used effectively to introduce the figure/ table without repeating data presented in the figure and table?
- How can data be presented most effectively (text, table, figure) to show the range of values for each analyte?

Is the reference appropriate/Is it needed in this section?

Citing tables and figures

- Cite in sequential order
- Cite at the end of a summarizing sentence, rather than using a sentence only to direct the reader to the table or figure.

~~The evolution of biochemical values of werewolf cubs between birth and 8 weeks of age is illustrated in Figure 1.~~

In werewolf cubs age-related differences were found for concentrations of total protein but not glucose (Figure 1).

Don’t repeat tabulated data in text

Table 1. Median and inter-quartile ranges (IQR) of total protein concentration (biuret method) and electrophoretic albumin and globulin measurements (serum) for 2 species.....

Analytical Method	*Species 1* (*n* = 50)		*Species 2* (*n* = 50)	
Biuret/Electrophoresis	Median	IQR	Median	IQR
Total Protein (g/L)	56.0	47.0-62.0	39.0	34.0-46.0
Albumin (g/L)	35.0	31.0-39.0	21.0	18.0-24.0
Globulin (g/L)	20.0	16.0-24.0	17.0	15.0-21.0

Results

The median protein concentration (biuret method) was 56.0 g/L for species 1 and 39.0 g/L for species 2 with interquartile ranges of 47.0-62.0 and 34.0-46.0, respectively….

Details in table, not repeated in text

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Globulin (g/L)	20.0	16.0-24.0	17.0	15.0-21.0

Results

By both biochemical and electrophoretic methods, protein concentrations were higher in species 1 (Table 1).

Keys to text in RESULTS

- Results parallel methods
- Text used to present simple data or summarize, but not repeat, detailed data found in tables/figures
- Significant digits and units used appropriately, absolute numbers provided, *P*-values reported
- Results not interpreted

Results

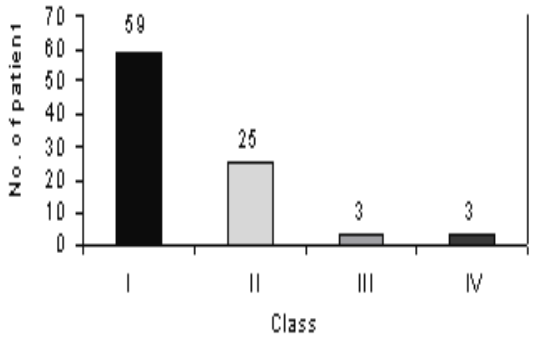
Text

Tables

Figures

Results
Immobilized SSO probe typing of 105 Croatian individuals yielded a total of 49 different mitotypes, 32 of which were observed only once. Table 2 provides a complete listing of the mitotypes obtained with immobilized SSO probe analysis. The most frequent mitotypes occurred 18 times or ~17.1% [111111 189 (A) 16093 (T)] and 11 times or

Respondents	Total	Men	Women
Students[a]	46 (41)	17 (37)	29 (63)
Postgraduates[b]	26 (23)	10 (38)	16 (62)
Specialists[c]	40 (36)	29 (73)	11 (27)
Total	112 (100)	56 (50)	56 (50)



From A. Marusic

Tables and figures

- To present detailed and important data
  - Should add value to the information
  - Should be self-explanatory
  - Limit to 1-2 main points

- Tables: data more important than trends
- Figures: trends more important than data

Table 1. List at least 3 things that could be improved

ANALYTE	BIRTH	WEEK 1	WEEK 2	WEEK 8
ALP	22.0-8975.0	22.0-1615.0	22.0-979.0	242.0-945.0
ALT	6-187	4-44	4-25	12-53
BUN	7.7-20.7	5.8-12.3*	2-8.6	3-7.2
CK	269-5759.0	243.0-1761	290.1-1,578	188-881
Creatinine	10-96.6*	10-64.8*	19.7-1.4*	38.2-169.2[1]
Glucose	2,33-8,0[1]	4,12-8,4	4,1-7,78	3,1-8,8
TOTAL PROT	25,0-49,0*	22,0-47,0*	23,0-44,0	35,0-58,0

*Potential outliers were detected and deleted according to Tukey or Dixon.[36]
All parameters were analysed with automatic Analyser Y (Silver Bullet Technologies).
BUN: Blood urea nitrogen, TOTAL PROT: Total proteins, ALP: alkaline phosphatase
[1]n = 29 because of outlier results

Table 1. Biochemical values in 30 clinically healthy werewolves from birth to weaning.*

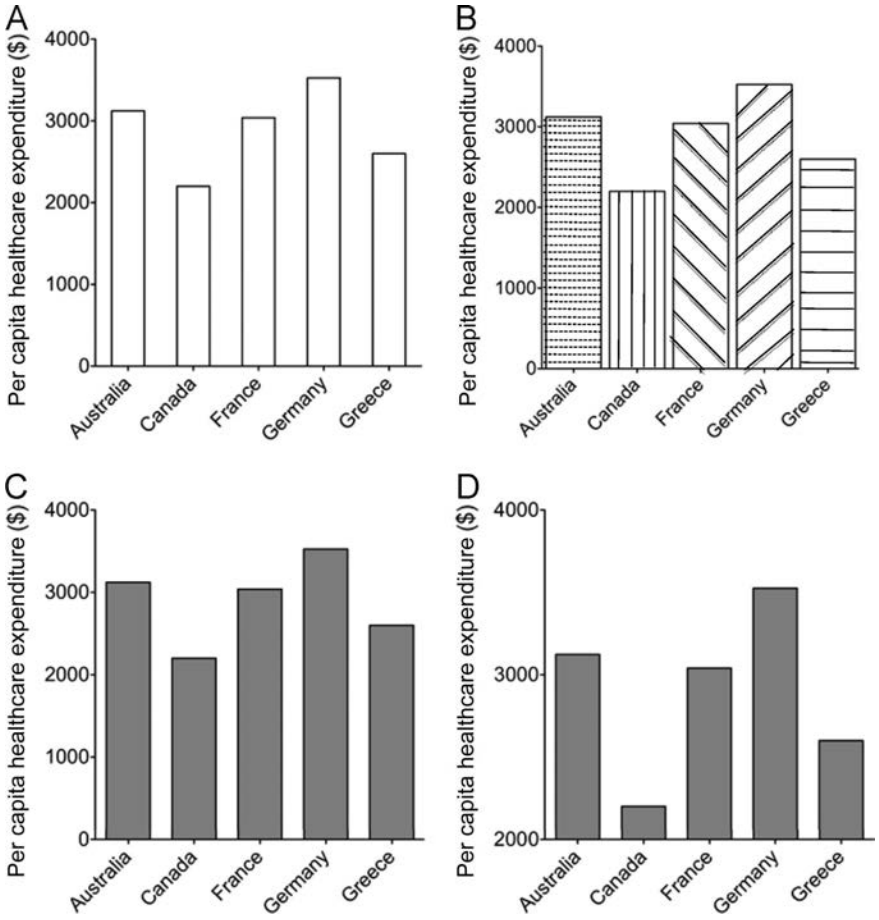
Analyte (unit)	Birth	Week 1	Week 8	*P* value†
ALP (U/L)	3510 (22-8975)	584 (22-1615)	483 (242-945)	.015
ALT (U/L)	29 (6-187)	14 (4-44)	20 (12-53)	.001
CK (U/L)	1235 (269-5759)	615 (243-1761)	440 (188-881)	.015
BUN (mmol/L)	11.5 (7.7-20.7)	8.3 (5.8-12.3)	4.6 (3.0-7.2)	.002
Creatinine (μmol/L)	51 (10-96)	33 (10-64)	48 (38-169)	.001
Glucose (mmol/L)	5.6 (2.3-8.0)	6.3 (4.1-8.4)	6.0 (3.1-8.8)	.830
Total protein (g/L)§	40 (25-49)	36 (22-47)	49 (35-58)	.001

*Data are median (range) for 19 Alpha and 11 Omega werewolves combined.
†Multivariate analysis for the effect of age.
§Values were significantly lower in Alpha cubs than Omega cubs at all time points ($P = .02$, Student's *t* test).
ALP = alkaline phosphatase; ALT = alanine aminotransferase; CK = creatine kinase

Graphs

- Show variance (eg, SD, SEM)
- Avoid clutter
  - Don’t put too much data in one graph
  - Avoid 3D graphs
  - Use sans-serif font
- Make sure clear and legible when reduced to column width

Bar graphs



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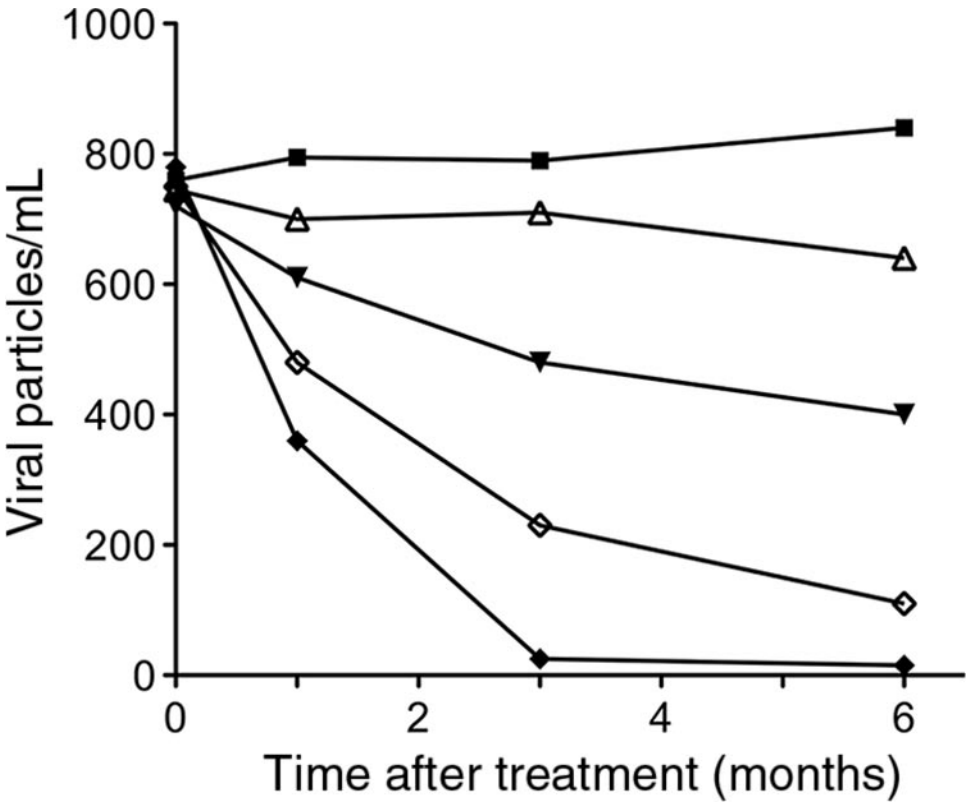
Line graph

Dependent variable



Independent variable

Fig. 1. Change in blood viral load during daily oral treatment with albenovir. ■, 0 mg/kg; Δ, 2 mg/kg; ▼, 5 mg/kg; ◇, 10 mg/kg; ◆, 20 mg/kg.

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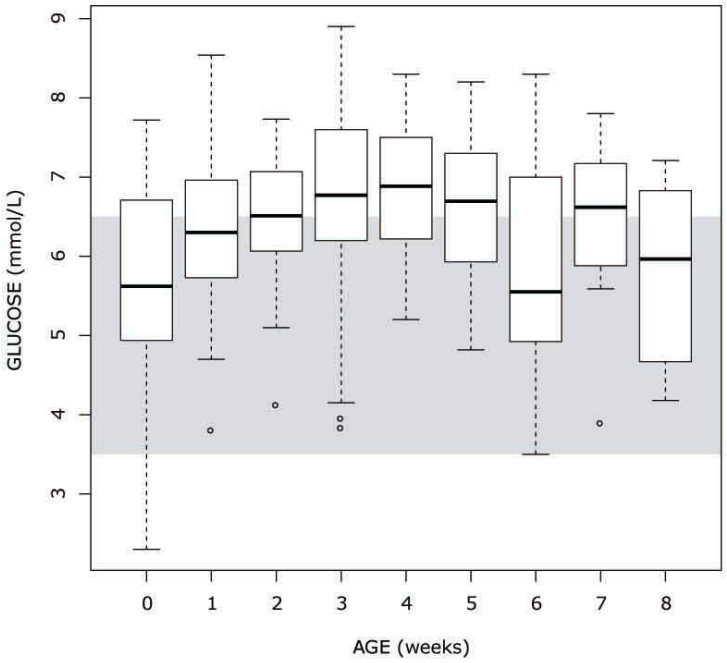
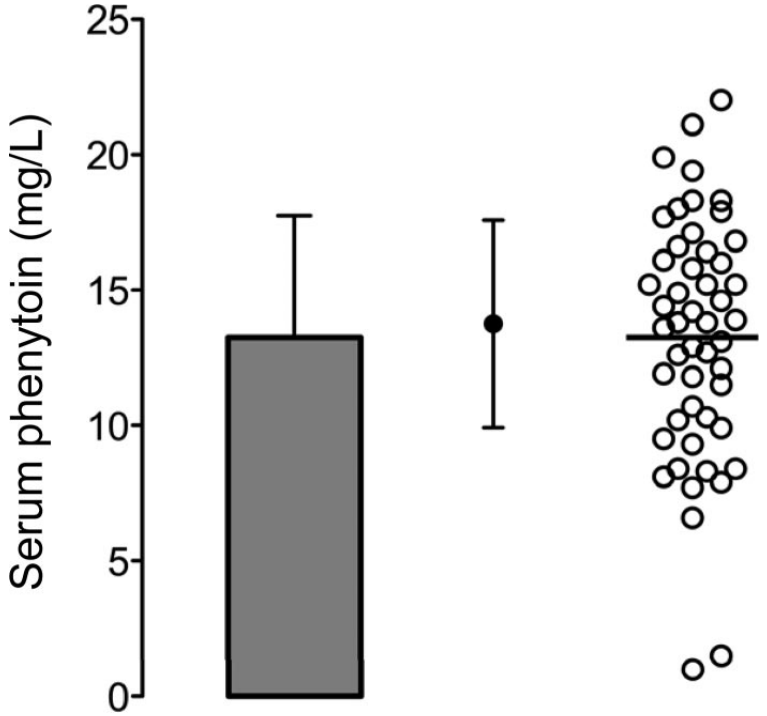
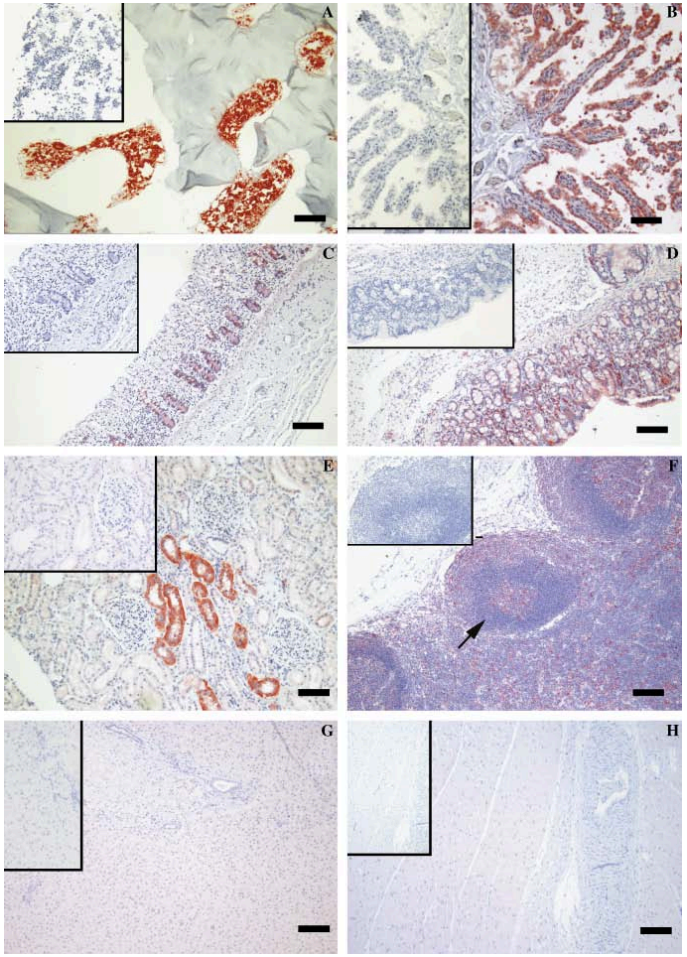
Show data distribution and variance





Photos and images

- High quality
  - High resolution
  - Good color balance
    - CMYK vs RGB
  - Crop extraneous space
- Internal scale marker
- Arrows and labels
- Follow guidelines for digital manipulation



Olver et al, *Vet Clin Pathol*, 2010

Keys to TABLES & FIGURES 

- Use to summarize and add value to your most important findings
  - Represent your data accurately
  - Always indicate variance
- Avoid redundancy with the text

Discussion

What has this study contributed to the scientific community?

Discussion

- What are the most important and novel findings of your study?
- How can your most important results be understood in the context of your objectives and the literature?
- What are the main conclusions and implications of your study?
- Inverse of Introduction: from important details to broad implications

The Discussion

Go
from your
specific novel/
important findings,
to discussion of results
in the context of your study
objectives and relevant literature,
to study limitations, and end with the
broad implications of your study, including
recommendations for future studies, if warranted.

Discussion

First paragraph

- What are the most important and novel findings of your study?
  - Did you prove your hypothesis?
  - Did you achieve your objectives?
- Do **not** repeat information from Introduction: discussion is a **continuation** of Introduction
  - Did you answer the research questions stated at the end of the Introduction?

Discussion

Middle paragraphs

- How can your most important results be understood in the context of your objectives and the ***relevant*** literature?
  - Highlight your main findings and discuss limitations
  - Compare your findings with other published data
  - Write 1 paragraph for each **important** result or limitation, ordered most to least important or in order of results

Discussion

Middle paragraphs

- Do **not** repeat specific results or introduce new methods or results
- Do not cite tables and figures
- Do not over-generalize or speculate wildly

Discussion

- Last paragraph
  Emphasize main conclusions and practical significance of your study
  - What is the message to the readers?

  What additional studies are warranted?

Problems with the Discussion

Too long! Too much!

- Repetition of introduction and results
- Review of the literature with no obvious relevance

Problems with the Discussion

- Limitations not discussed
- Conclusions go beyond the findings

First paragraph:

In this research, we performed biochemical analysis on werewolf cubs each week from birth to 2 months of age. We analyzed our data using the robust method and Box-Cox transformation. We performed this study because there are not many relevant and exhaustive studies on the biochemical parameters of werewolf cubs and this makes it challenging for clinicians to diagnose disease in cubs.

Does this paragraph present the most important and novel findings? Did the authors prove their hypothesis and achieve their objectives?

- Repeats information from Introduction
- Repeats aim of study
- Does not define important novel findings or contributions to scientific community

Does this paragraph present the most important and novel findings? Did the authors prove their hypothesis and achieve their objectives?

Rewrite the first sentence of the Discussion

Significant age-related variations in total protein concentrations of werewolves were identified in this study, and the values for healthy werewolf cubs were outside the RI reported for adults.

What are the strengths of this study?

Temporal changes in biochemical analytes identified in werewolf cubs

Differences with adult values may have an impact on diagnosis and management of disease

Future studies warranted

What are the limitations of the study… and the writing?

Not clear why rapid growth would contribute to hypoproteinemia

New method and results introduced (refractometry)

Limitations not addressed:

- Albumin and globulins not measured, so conclusions about hepatic function cannot be drawn.
- Immune function (gamma globulins) of cubs not addressed

(Paragraph 2)

What are the limitations of the study…
and the writing?

Limitations not addressed:

- Low number of cubs
- Lack of genetic diversity (many cubs from same dam)
- Many analytes not measured owing to small volume of plasma
- Adult reference intervals generated with different instrument

(Paragraph 3)

Last (concluding) paragraph:

Clinicians need to be aware of the healthy biochemical values for werewolf cubs during the first 2 months of life so those values will not be misinterpreted as representing illness.[9] Few clinical studies in werewolf neonatology have been conducted. This study confirmed that total protein concentration was significantly different in cubs and adult werewolves. The awareness of physiologic differences between these groups is important to avoid medical mistakes. The established reference intervals for blood tests in cubs presented in this paper should help the veterinarian in daily clinical situations. Knowledge of differences between neonatal and adult blood serum biochemical concentrations are essential for understanding disease processes and developing therapeutic strategies.

Does this last paragraph succinctly convey the main conclusions/implications of the study and indicate what additional studies are warranted?

- Too wordy
- Main message lost
- No mention of additional warranted studies

Rewrite the first sentence of the concluding paragraph

This prospective study confirmed that total protein concentrations were significantly different in werewolf cubs compared with those of adults. Clinicians should be aware of temporal changes in biochemical values for cubs during the first 2 months of life to avoid misinterpretation of results. Future studies are needed to establish valid reference intervals for biochemical analytes in werewolf cubs, especially during the first week of life, based on a large and heterogeneous reference population.

Keys to DISCUSSION

- What are the most important and novel findings of your study?
- How can your most important results be understood in the context of your objectives and the literature?
- What are the main conclusions and implications of your study?
- Inverse of Introduction: from important details to broad implications

Reinforcing the main message

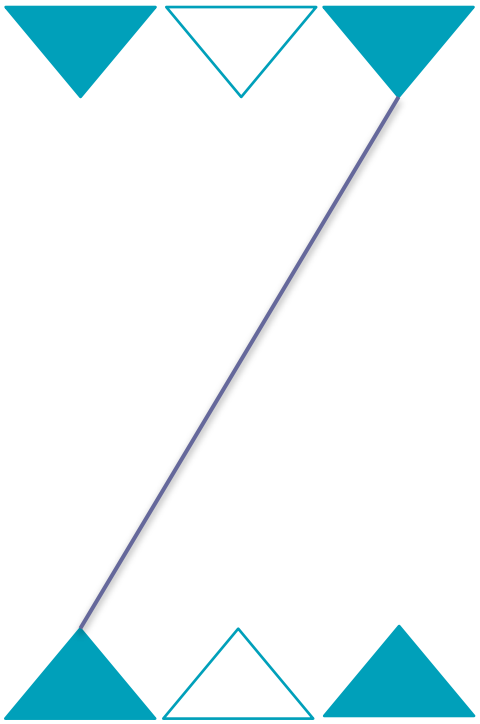
Introduction

Methods

Results

and

Discussion



We hypothesized that glucose and protein values in neonatal werewolves would differ by age….

Significant age-related variations in total protein concentrations of werewolves were identified…

Reinforcing the main message

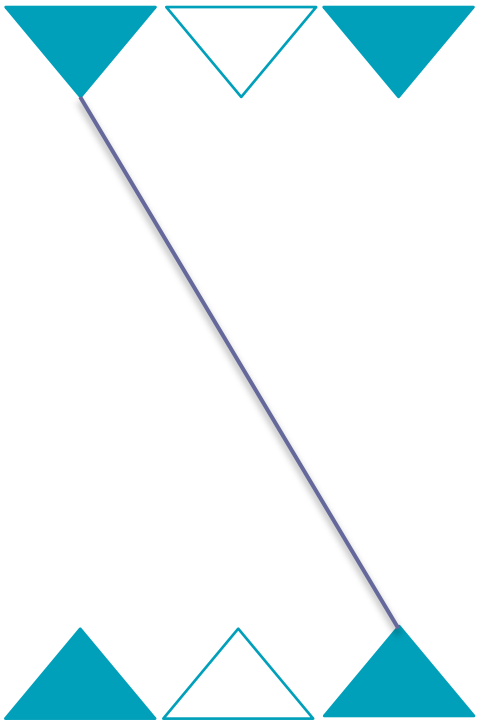
Introduction

Methods

Results

and

Discussion



Diagnosis of disease in neonates is challenging for practitioners…

…clinicians should be aware of temporal changes to avoid misinterpretation of results.

The title

- The fewest number of words to describe the content of a paper
  - Accurate
  - Informative
  - Succinct
- Highly visible, read, searched
- From the reader's perspective: should I read this paper?

Biochemical parameters in neonatal werewolves

Is it informative?

Age-related changes in plasma biochemical concentrations in clinically healthy neonatal werewolves (*Lycanthrope* sp.) from birth to 8 weeks of age and with comparison to adult values

Is it succinct?

Plasma biochemical values in werewolf cubs (*Lycanthrope* sp.) from birth to weaning

Abstract

Biochemical evaluation of neonatal werewolves can improve disease diagnosis and reduce mortality. Previous biochemical studies are limited or use methods that are now obsolete. Werewolf breeds have also evolved considerably in the last 100 years, which could affect biochemical results. The aims of this study were to evaluate biochemical changes in two breeds of werewolf cubs from birth to weaning, to compare the results with reference intervals (RIs) for adult werewolves, and to calculate preliminary neonatal reference values. Blood was collected in heparin from nonfasted cubs of Alpha and Omega breeds at birth and weekly for 8 weeks. Concentrations of urea, creatinine, glucose, and total protein and activities of alkaline phosphatase (ALP), alanine aminotransferase (ALT), and creatine kinase (CK) were measured in plasma. Results were compared by age and breed using a multivariable model and with adult RIs. Preliminary age-based reference values were calculated using the parametric robust method after Box–Cox transformation. Thirty healthy werewolf cubs, 19 Alphas and 11 Omegas, were evaluated. The effect of age was significant ($P < .001$) for all variables except glucose concentration. Compared with adult RIs, cub values did not differ significantly for ALT activity and glucose concentration. CK activity was higher and total protein concentration was lower for cubs compared with adult values at all weeks ($P < .05$). Urea concentration was higher at birth and week 1, creatinine concentration was lower at weeks 1–5, and ALP activity was higher except at weeks 4 and 6 ($P < .05$). Total protein concentration was lower in Omega cubs than in Alpha cubs ($P = .02$). Biochemical values in werewolf cubs from birth to weaning are similar between breeds. Substantive differences from adult values warrant the development of age-specific neonatal werewolf RIs using a large reference population

Background: Biochemical evaluation of neonatal werewolves can improve disease diagnosis and reduce mortality. Previous biochemical studies are limited or use methods that are now obsolete. Werewolf breeds have also evolved considerably in the last 100 years, which could affect biochemical results.

Objectives: The aims of this study were to evaluate biochemical changes in two breeds of werewolf cubs from birth to weaning, to compare the results with reference intervals (RIs) for adult werewolves, and to calculate preliminary neonatal reference values.

Methods: Blood was collected in heparin from nonfasted cubs of Alpha and Omega breeds at birth and weekly for 8 weeks. Concentrations of urea, creatinine, glucose, and total protein and activities of alkaline phosphatase (ALP), alanine aminotransferase (ALT), and creatine kinase (CK) were measured in plasma. Results were compared by age and breed using a multivariable model and with adult RIs. Preliminary age-based reference values were calculated using the parametric robust method after Box–Cox transformation.

Results: Thirty healthy werewolf cubs, 19 Alphas and 11 Omegas, were evaluated. The effect of age was significant ($P < .001$) for all variables except glucose concentration. Compared with adult RIs, cub values did not differ significantly for ALT activity and glucose concentration. CK activity was higher and total protein concentration was lower for cubs compared with adult values at all weeks ($P < .05$). Urea concentration was higher at birth and week 1, creatinine concentration was lower at weeks 1–5, and ALP activity was higher except at weeks 4 and 6 ($P < .05$). Total protein concentration was lower in Omega cubs than in Alpha cubs ($P = .02$).

Conclusions: Biochemical values in werewolf cubs from birth to weaning are similar between breeds. Substantive differences from adult values warrant the development of age-specific neonatal werewolf RIs using a large reference population

Abstract

- Highly accessed and read
  - Make sure it's complete, accurate, informative
- Repeat key phrases from your manuscript
- Minimize abbreviations; no references
- Never say "will be discussed"
- Respect word limits

Keys to ABSTRACT

- Structure it!
- Focus on the most important findings
- Use key phrases from the manuscript to reinforce your message

An approach to writing

- Organize your main ideas
  - *Convey a clear and compelling message*
- Think about your audience
  - *Select a target journal*
- Organize and write a first draft
  - *It's okay to write garbage, as long as you edit…*
- Revise and edit
  - *With feedback*

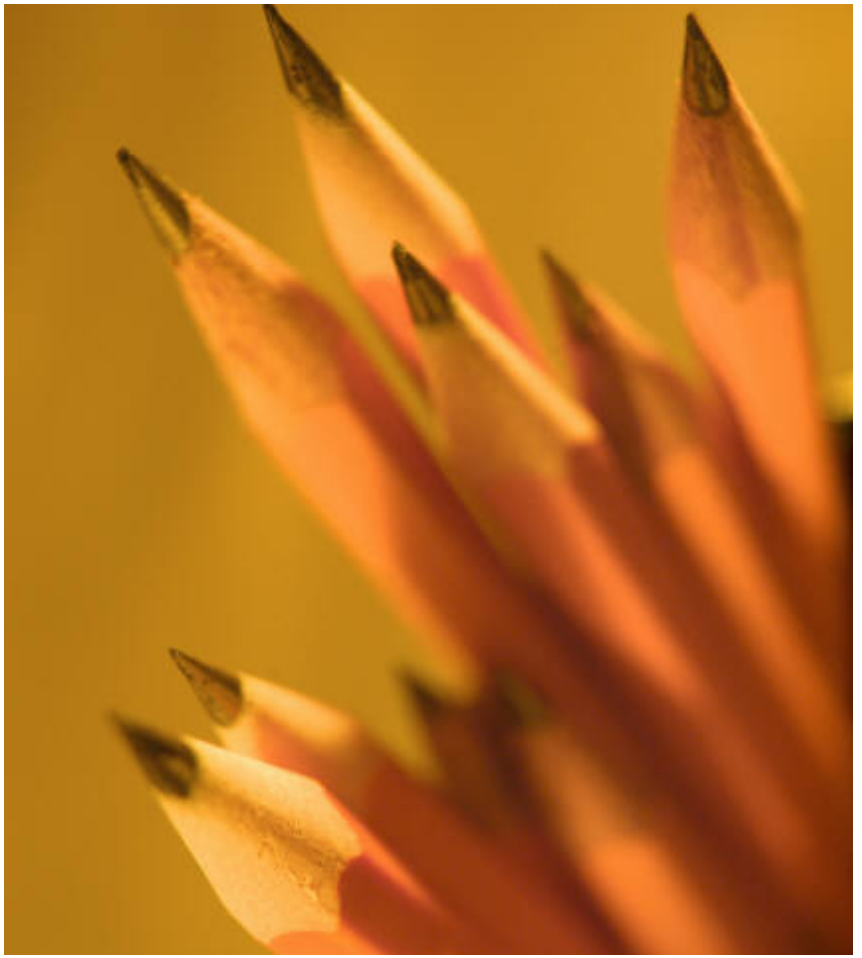
Organize your main ideas (start now)

- Files for each section of the manuscript
  - Notes, forms, data, references, ideas, etc.
  - Outline the sections
- Write a working title and abstract
- Draft the tables and figures

Introduction Methods Results Discussion

Write…

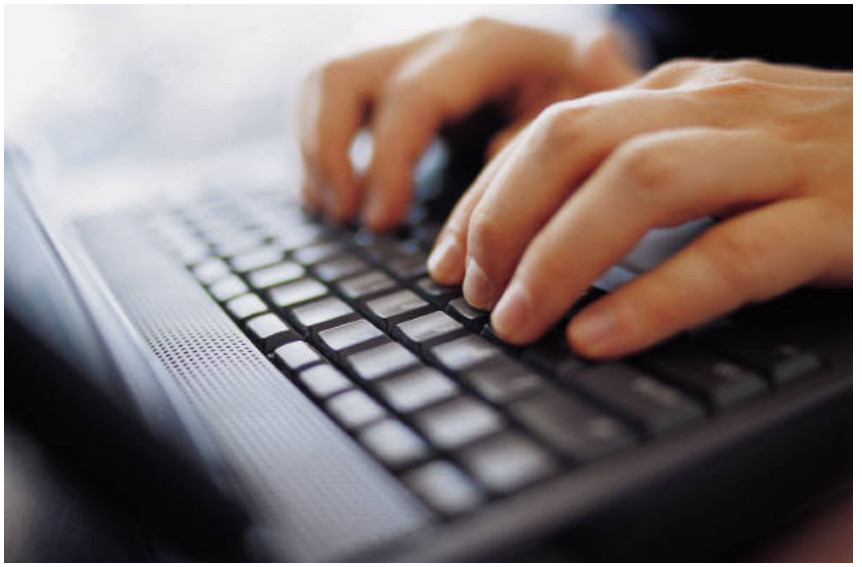
- A first draft
  - Quickly, no censoring or perfecting
- Write in any order, but here's a good option:
  - Methods
  - Results
  - Introduction
  - Discussion




Pause
Think
Reflect

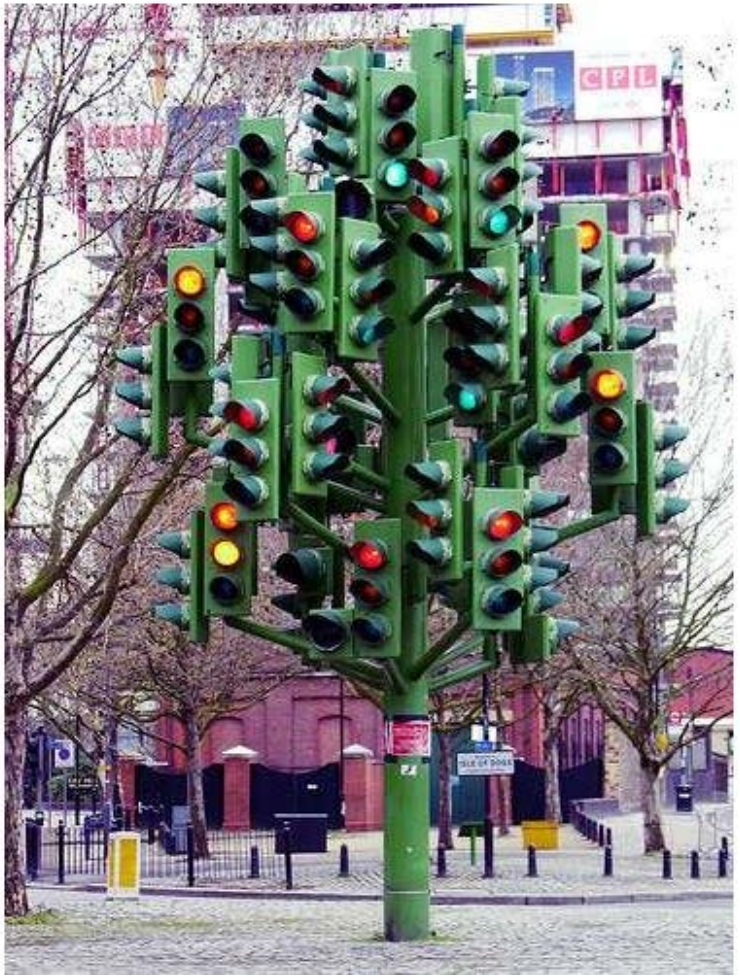
…then revise…and revise…and revise

- Organization
- Clear, consistent message
- Accuracy of details
- Quality of writing



Edit yourself

Unclear English language is a major reason for immediate rejection of a manuscript



- Scientific meaning uncertain
- Reviewer time prioritized

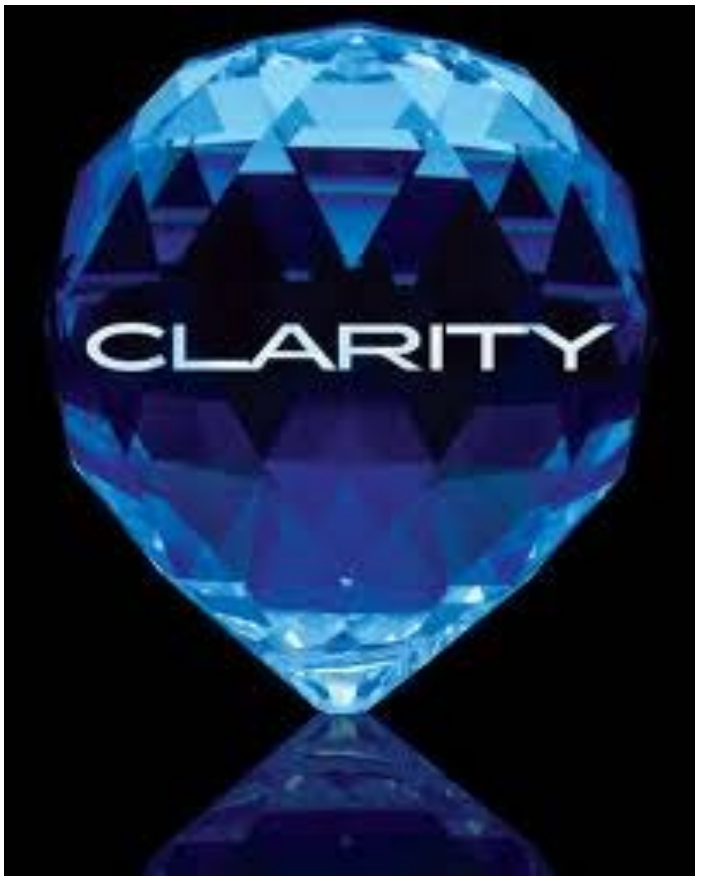
Edit yourself

- Be organized!
  IMRaD
- Be clear!
  Is the writing simple and concise?
- Be precise
  Are you saying exactly what you mean to say?
- Be persuasive

Be clear!

Are the key ideas prominent?

- **Emphasize** what is **important**
- De-emphasize what is of secondary importance
- Eliminate what is of no importance



All words beyond the minimum tend to damage clarity.

Write **simple** sentences that are **concise** (no extra words) and **precise** (use correct words)

- The more complicated the study design or the concept, the more important it is to use simple clear sentences in your description.
- As long as necessary, as short as possible

Use short sentences…
…and arrive quickly at the verb

Relative sensitivity of five different Egyptian plant species, namely *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus* to elevated levels of ozone has been studied.

Environ Poll. 2003

Relative sensitivity of five different Egyptian plant species, namely *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus* to elevated levels of ozone has been studied.

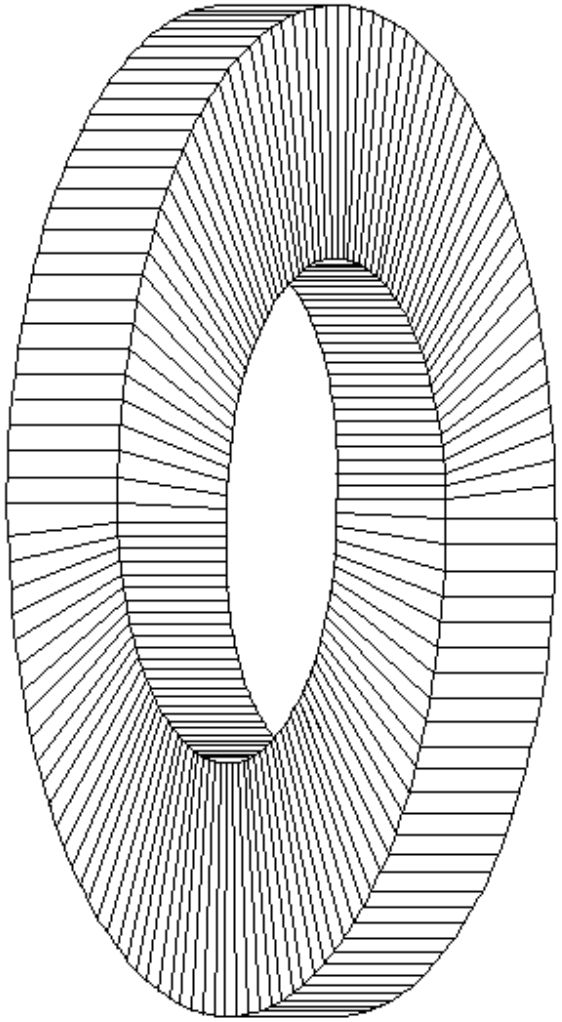
Relative sensitivity of five Egyptian plant species to elevated levels of ozone has been studied.

Environ Poll. 2003

Clarity

Be assertive, rather than cautious or ambiguous

In our opinion we think that maybe the combination of ultrasonographic imaging and guided fine-needle aspiration might yield the best probability of achieving a diagnosis.



Clarity

Be assertive, rather than cautious or ambiguous

Combined ultrasonographic imaging and guided fine-needle aspiration are best for achieving a diagnosis.

Avoid excessive caution

- There is evidence that…
- It is generally believed that...
- It may be expected that…
- It appears that…

Avoid weak or nonspecific words:
might, *tend to*

Use the verb – not the noun – to indicate action

Examination of the foal was carried out.

What is the important action?

The action is *examined*.

x **Examination** of the foal was carried out.

✓ The veterinarian **examined** the foal.

“Release” the active verb

Change this…	…to this
We came to the conclusion	We concluded
The calves underwent an examination	We examined the calves
The results were indicative of	The results indicated
We performed an analysis	We analyzed

Avoid stacked modifiers

The results of this randomized, double-blind, placebo-controlled trial demonstrated that this drug is effective…

Avoid stacked modifiers

purified pro-oxidant vitamin E-deficient fish oil diet

Rephrase to:

pro-oxidant diet containing fish oil, but deficient in vitamin E

Grammar

- RELAX!
  - Publisher's copyeditor will correct fine points of grammar….
    after acceptance

- But…to improve the chance of acceptance, your meaning must be clear to reviewers and editors.

Grammar

- Agreement of subject and verb: singular vs plural
  - Find the subject of the sentence.
    The increase in enzyme activities was
  - These words take a **plural** verb:
    Data, media, criteria, bacteria

Verb tense

4 rules for tense in scientific writing

1. Use present tense for established knowledge.
2. Use past tense to describe your methods and results.
3. Use present tense to refer to presentation of data in a table or figure (Table 1 shows…).
4. Use past tense when attributing knowledge to someone else.

Abbreviations

- Limit use and don't use in title
- Avoid in abstract
- Don't abbreviate short words
- Spell out at first usage, except units of measure (kg, mL)
- Follow journal guidelines!

Be precise with your words!

What to do…and what not to do

Be precise with your words!

Use:

- simple words
- specific words
- correct words
- correct terminology
- connecting words for clarity

Be precise with your words!

- Delete extra words
- Avoid redundancy
- Avoid double negatives
- Avoid *and/or*
- Avoid metaphors, clichés, idioms, euphemisms, jargon/slang
- Avoid biased language

Use simple words

- count instead of enumerate
- use instead of utilize
- make instead of fabricate
- do instead of perform
- have instead of exhibit
- give instead of administer
- end instead of terminate

Use specific words

Specific words are more **precise** and make your meaning **clearer**.

Avoid general or vague words

<u>verbs:</u>

affect, change, alter, influence

<u>nouns:</u>

thing, aspect, factor

Use specific words

Treatment affected clinical aspects of the disease.

Affected how? made better? made worse?

What clinical aspects?

Better to write:

Heart rate returned to normal with treatment.

Delete extra words

Very, quite, fairly
The

~~The~~ increases in enzyme activity were ~~very~~ marked.

Increases in enzyme activity were marked.

Delete extra words

- In conjunction with
- In order to
- Was found to be
- Few in number

Delete extra words

- ~~In conjunction~~ with
- ~~In order~~ to
- Was ~~found to be~~
- Few ~~in number~~

Delete extra words

Avoid redundancy.

Blue *in color*
Round *in shape*
Large *in size*

Delete extra words

Avoid redundancy.

Blue *in color*	→	Blue
Round *in shape*	→	Round
Large *in size*	→	Large

Avoid double negatives – they are a no-no!

Avoid double negatives

Not insignificant → _____

Not infrequent → _____

Not inappropriate → _____

Avoid double negatives

Not insignificant	→	Significant
Not infrequent	→	Frequent
Not inappropriate	→	Appropriate

Avoid jargon/slang

We examined the cytospin of abdominal fluid.

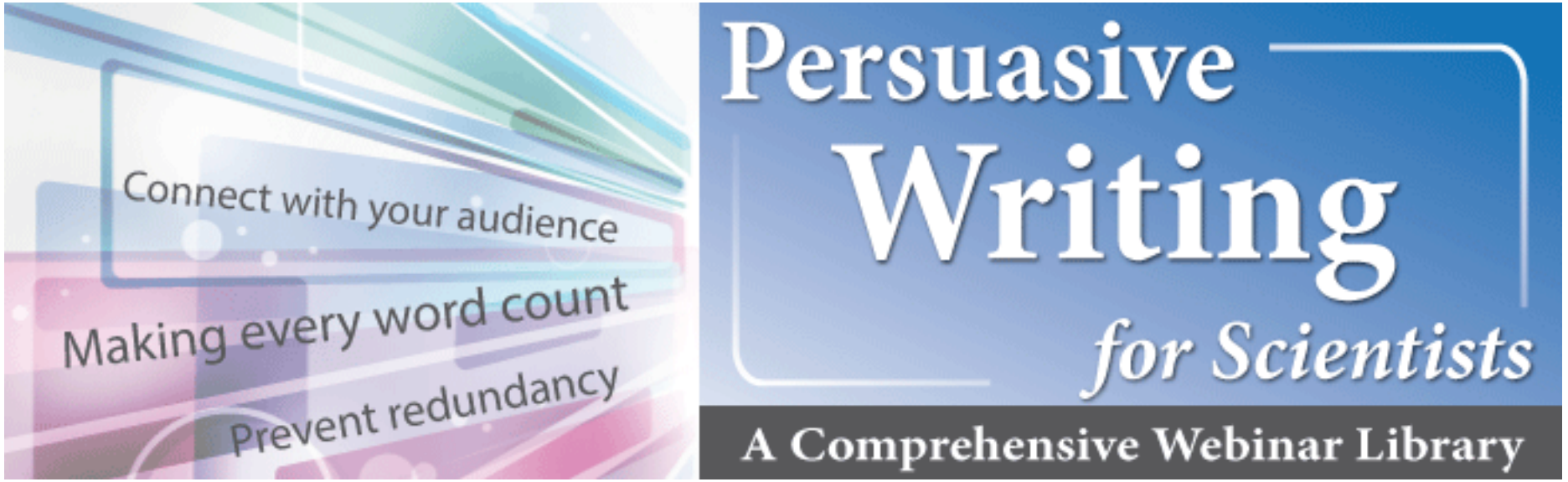
Cytospin is the trade-marked name of an instrument (a cytocentrifuge)

Instead, write:

We examined the cytocentrifuged specimen of abdominal fluid.

Be persuasive!

Organization, clarity, and precision will lead to persuasion



Be persuasive!

- Repeat the main message effectively:
  - Make the strength of your study clear!
- Explain why (‘because….’)
- Be consistent
- Make comparisons
- Address limitations
- Tell a story

Follow journal guidelines!

- Read guidelines before, during, and after writing your manuscript
- Format, length (word count), article types, reporting requirements
- Read articles in your target journal
  - Examples of format for your article type
  - Level of detail in methods section

General advice

- Self-editing
  - Check that the flow of the manuscript is logical and orderly
  - Check spelling, grammar, punctuation
  - Proofread carefully for accuracy, especially numbers, decimals, tables, and charts

- Read your manuscript aloud to yourself

Missing words

When you read, your brain inserts words that are *not* there that are *supposed* to be there. The process of speaking what you read forces your brain to read what is *actually* there.

M. B. Weston

General advice

- After acceptance, read the publisher's proof **carefully** – copyeditor may have changed your meaning.

Summary

- Is the content organized?
- Is the meaning clear?
- Is the writing precise?
- Is the writing persuasive?

“We loved all the words in your manuscript, but we were wondering if you could maybe put them in a completely different order.”