

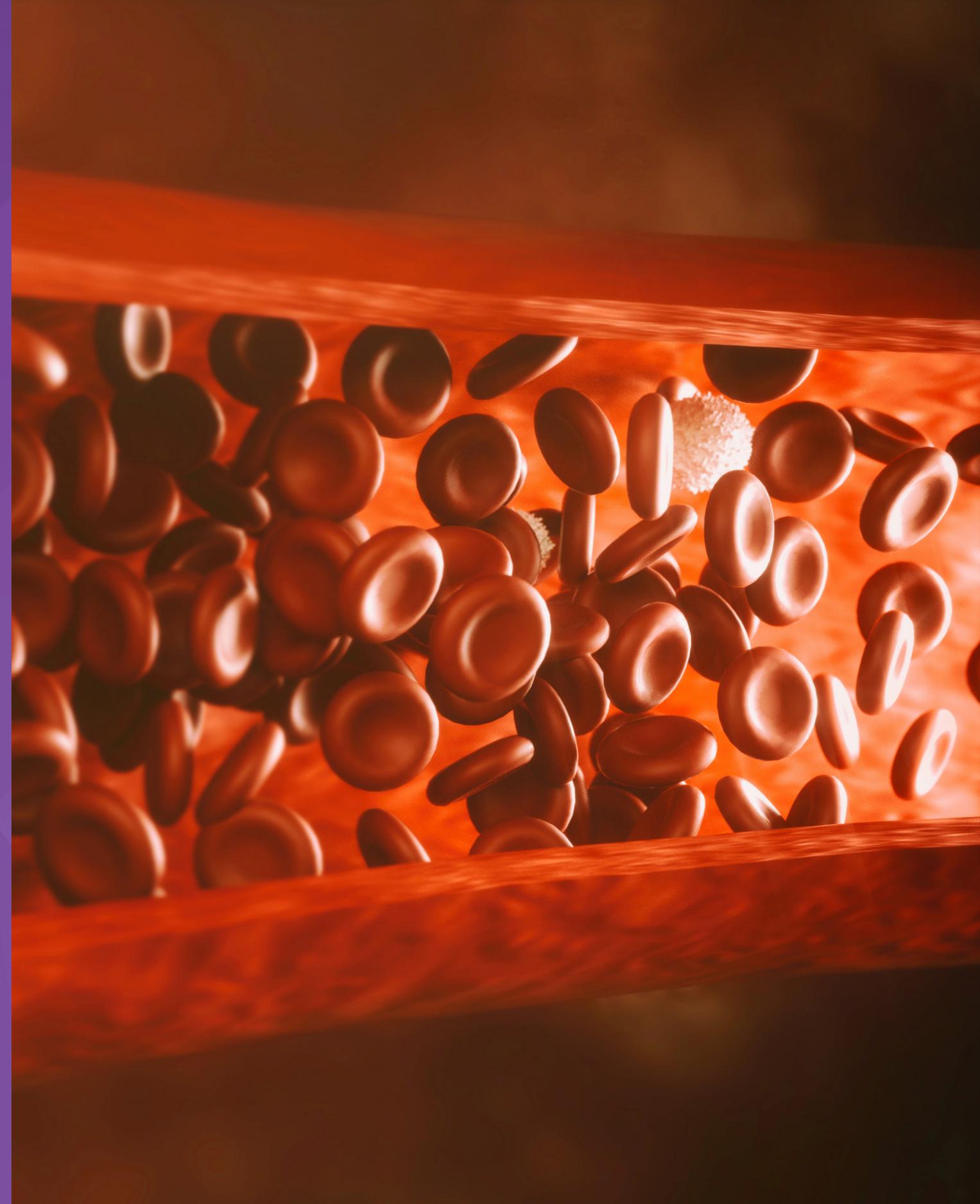


CRP measurement in dogs

By Dr Celia Hooper

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How do vets currently assess inflammation?

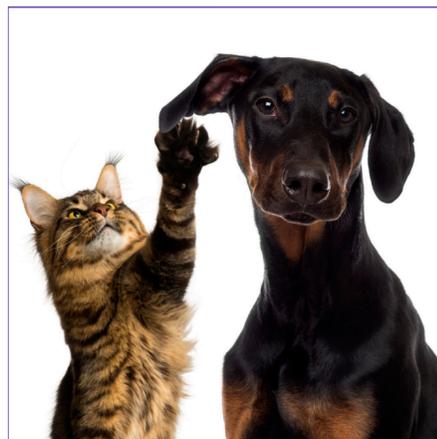
Clinical exam and history	<ul style="list-style-type: none">• Pyrexia• Specific signs related to organ• Visible pus!
Haematology	<ul style="list-style-type: none">• Neutropenia (hours)• Neutrophilia (days)• Left shift, toxic changes (hours to days)• Monocytosis (days)
Biochemistry	<ul style="list-style-type: none">• Globulin increase (weeks)• Albumin decrease (weeks)



Inflammatory markers in peripheral blood testing

Haematology and biochemistry parameters are insensitive

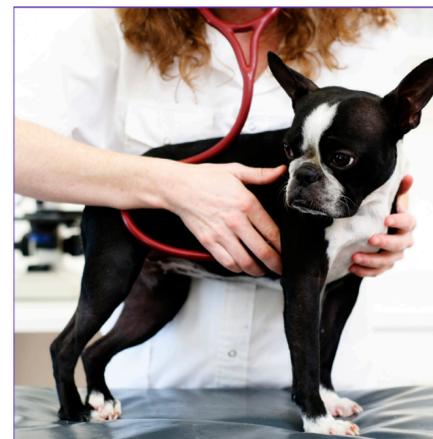
- They change quickly, but not quickly enough
- Many of our animals have a background of inflammatory disease



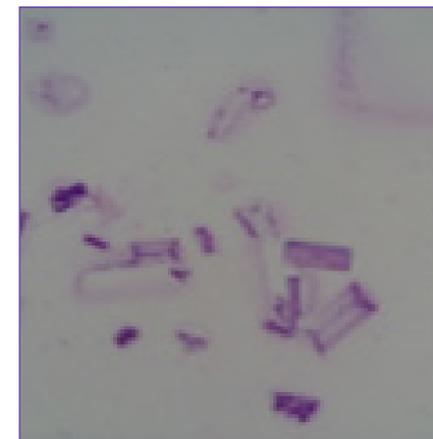
Pain



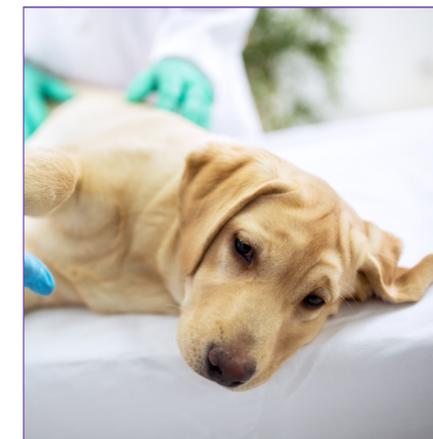
Anorexia



Weight Loss



Renal Damage



Cardiac Damage



Anaemia

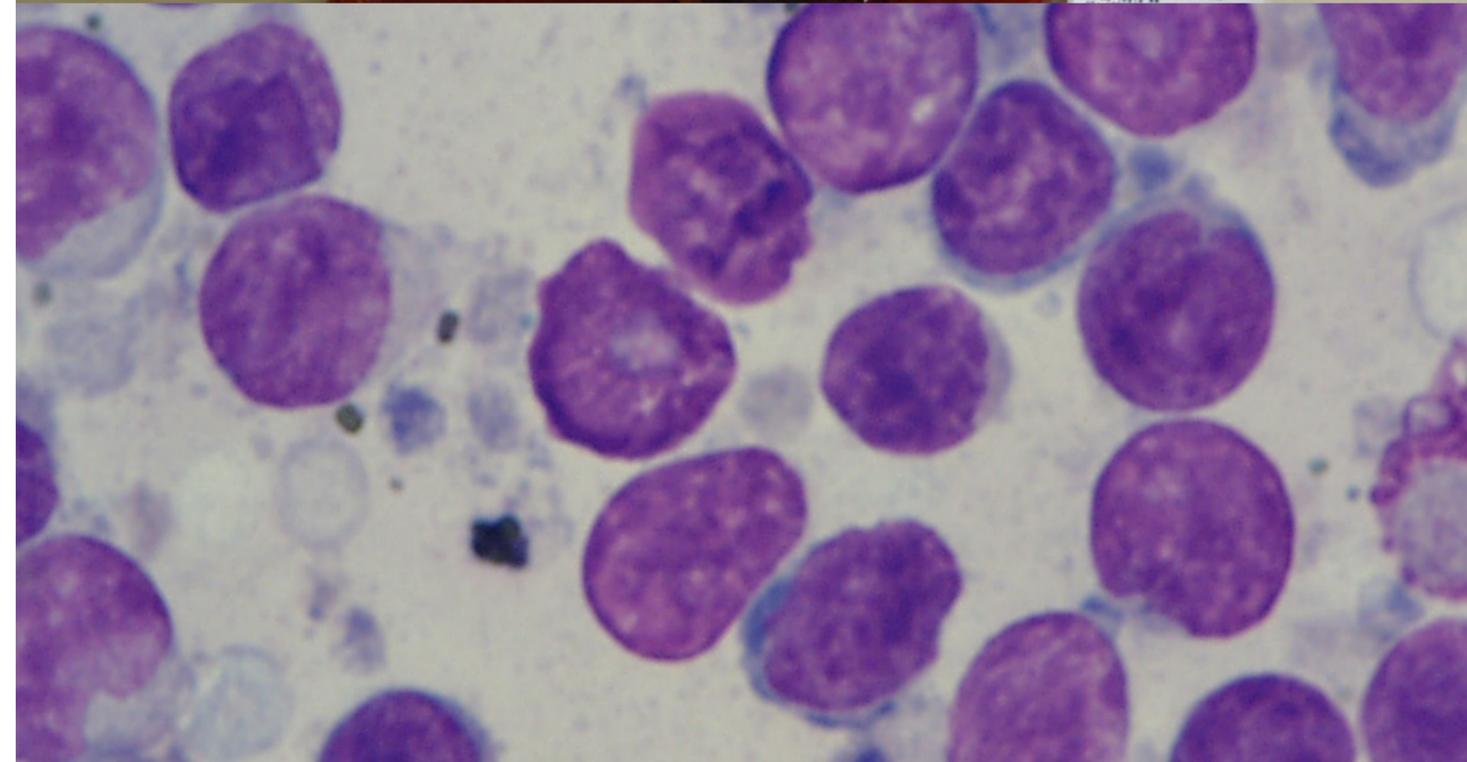
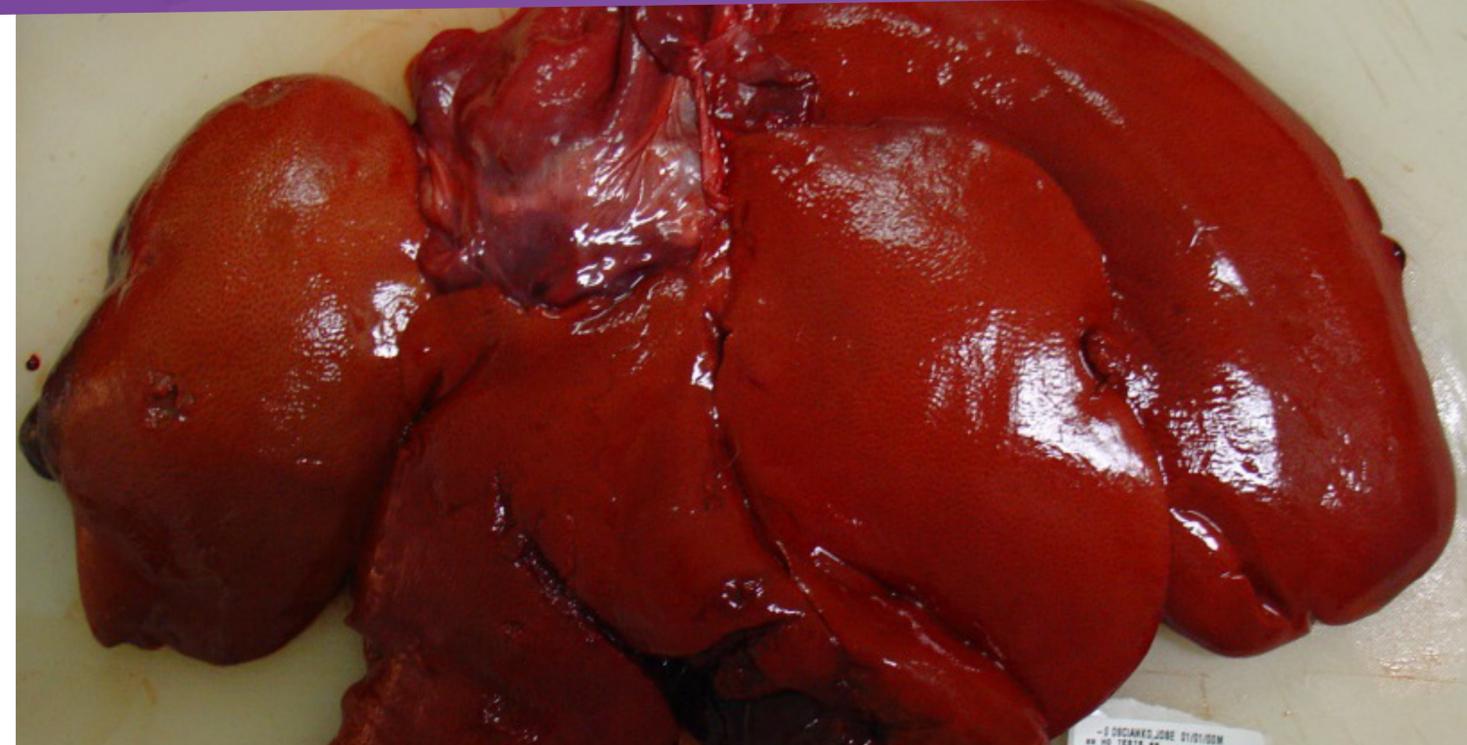
Proteins in inflammation

Acute phase proteins are produced by the liver and change in hours to days

C-reactive protein (CRP) Haptoglobin Fibrinogen Serum Amyloid A (SAA) Thyroglobulin	Increases
Albumin Transferrin	Decreases

Chronic phase proteins are produced by lymphocytes and change in weeks

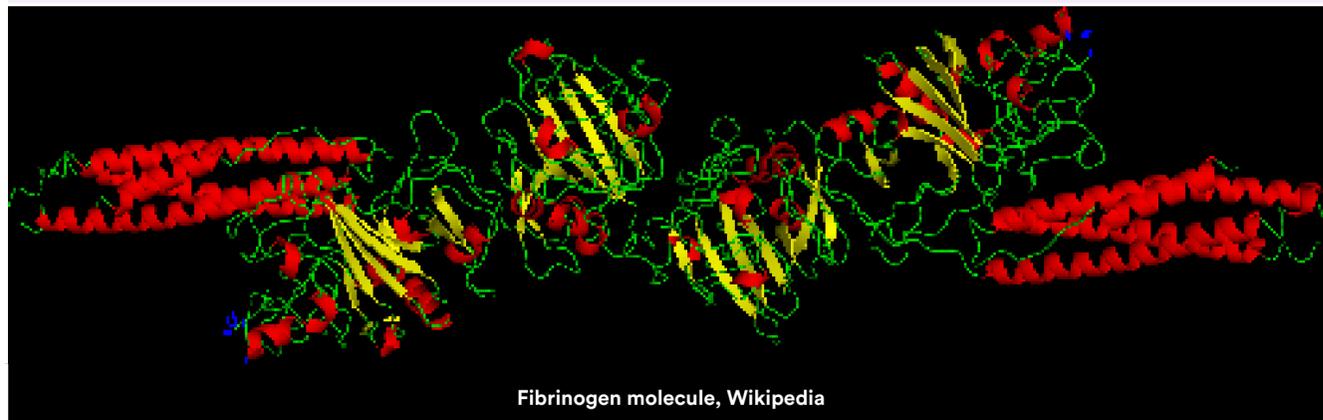
Antibodies Complement
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Acute phase proteins

Fibrinogen (all species)

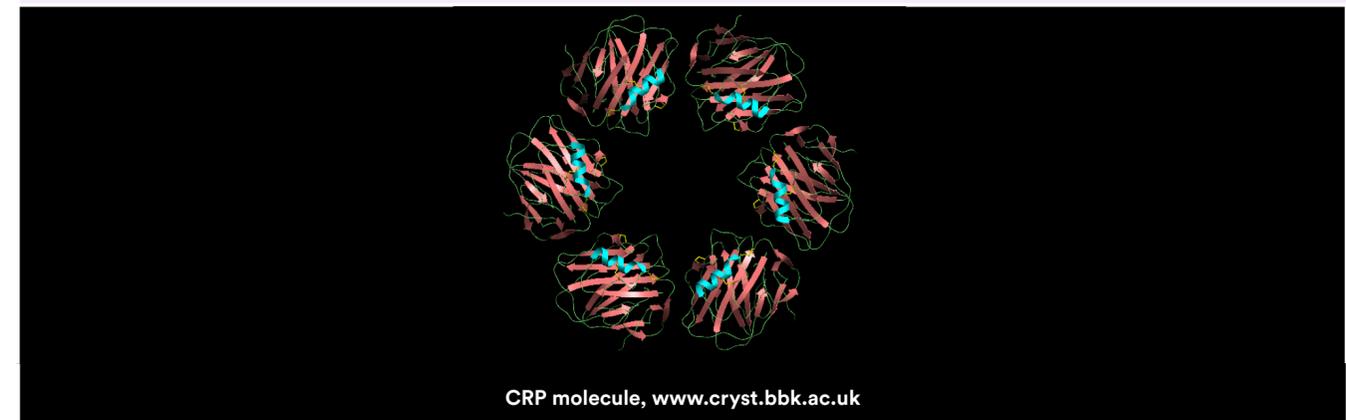
Needed for fibrin clot formation



- Affected by bleeding, vascular damage and dehydration
- Not sensitive in dogs, cats
- Used for horses, ruminants

C-reactive protein (dogs)

Binds dead cells and bacteria



- Not involved in haemostasis
- Not affected by dehydration

A sensitive indicator of inflammation

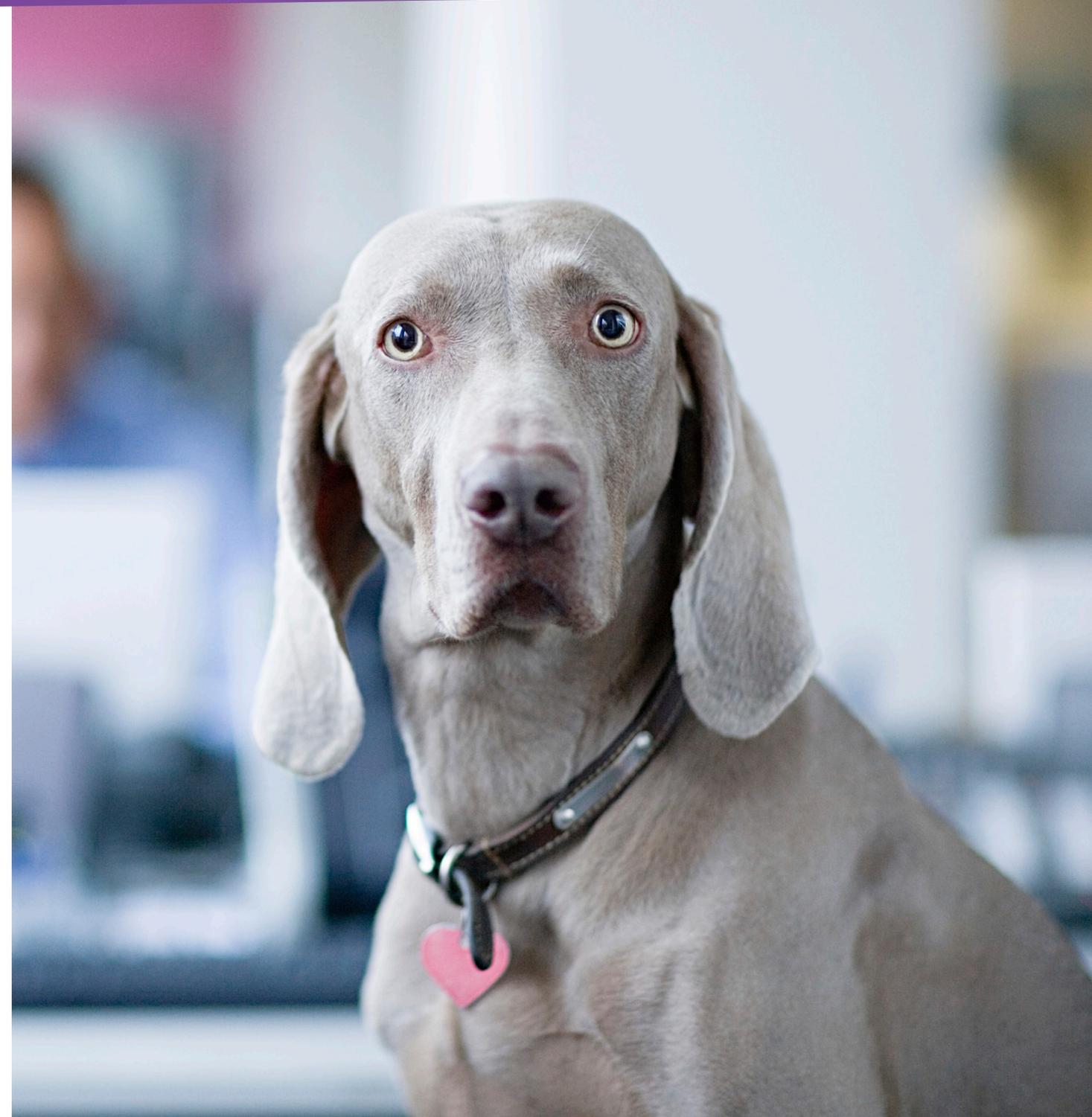
C-reactive protein in your clinic

CRP is a useful marker that will tell you:

- Whether there is inflammation in your patient
- How bad it is
- Whether it's getting better or worse, ie monitoring

It can also be used to assess success of surgical or medical management of many conditions including neoplasia and inflammation.

- Use it in your annual health check to detect occult inflammatory disease
- Use it in any sick animal: monitoring to assess progress
- Use it in monitoring response to chemotherapy



How do I interpret CRP?

It's included in your total body function profile

<10 mg/L	The animal is unlikely to have a current systemic inflammatory process of significance. Any clinical signs are more likely to be due to disease without an active inflammatory component.
10-40 mg/L	Borderline results; there may well be a minor component of inflammation, or there may be early or resolving inflammatory disease present. It is also possible that renal disease reduces clearance of CRP, leading to concentrations in this range.
>40 mg/L	Most animals with significant inflammatory disease will have concentrations in this range, often well above 100.



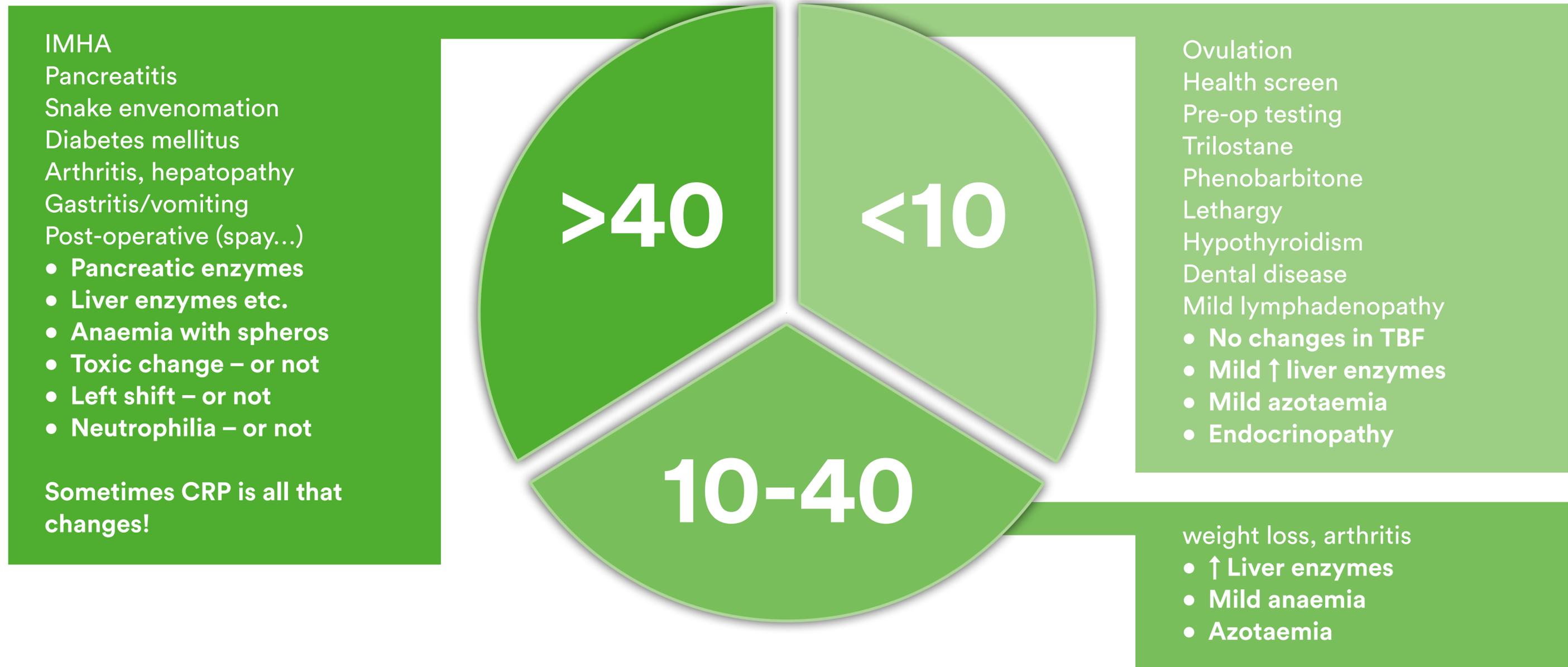
How do I interpret CRP?

It's included in your total body function profile

<10 mg/L	Not inflammatory
10-40 mg/L	Might have some inflammation
>40 mg/L	Likely to have a significant degree of inflammation



Real life experience – typical history and lab findings



Effects of interferents

Haemoglobin up to 10g/L (4+) doesn't have a clinically significant effect.

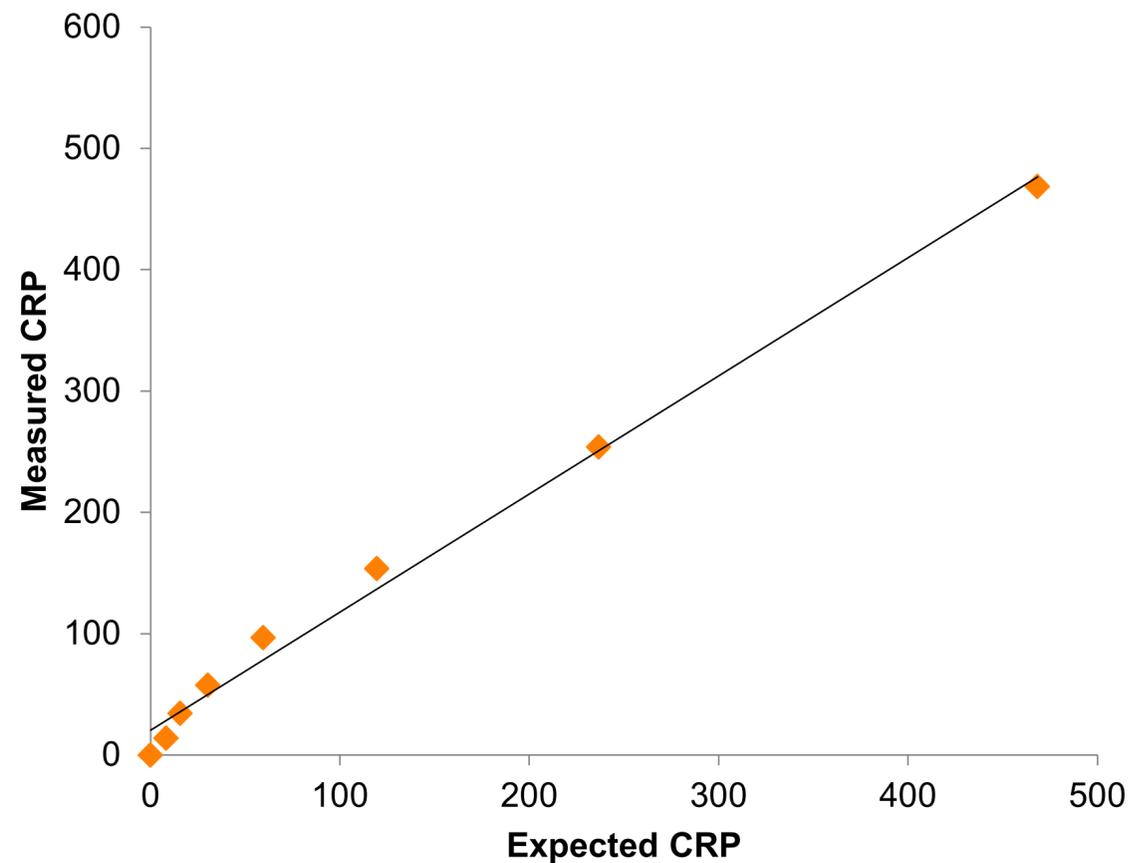
Lipaemia seems to have an unpredictable effect and should be avoided or interpreted with care even after sample is ultracentrifuged and lipid removed.

Icterus effect is currently unknown.

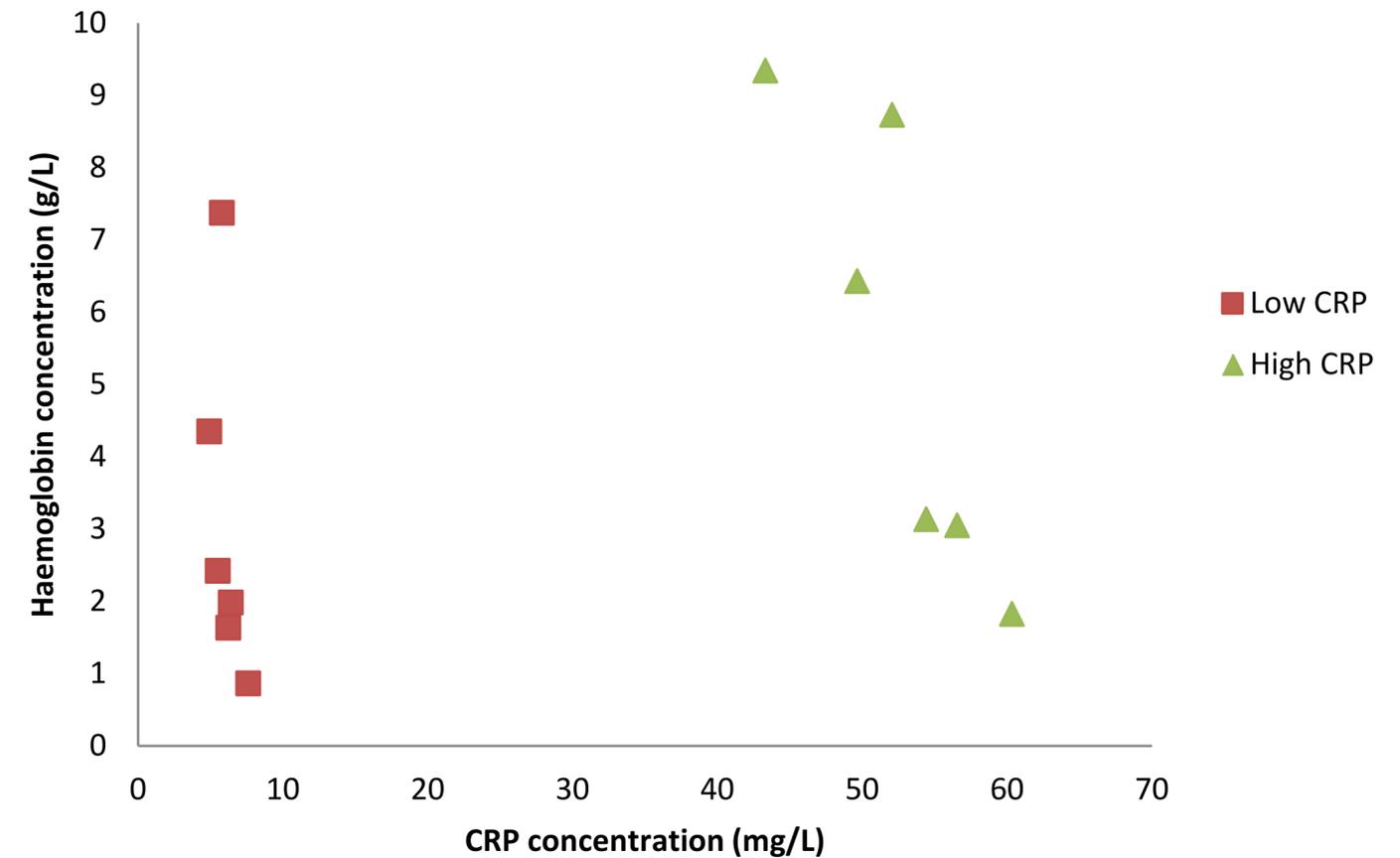


Extensive method validation in house

Repeatability, linearity, intra-assay and inter-assay variability, comparison to quality control material and effects of haemolysis, lipaemia, icterus.



Linearity (recovery at increasing dilutions)



Effect of haemolysis determined through addition of haemoglobin to serum samples with low and high CRP concentration



Thank you for watching

Please feel free to contact me if you have any further questions.

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Celia commenced her career with 5 years in mixed farm animal practice. She has now spent over 25 years in pathology, in England, the USA, New Zealand and Australia. Celia calls herself a generalist, meaning she is interested in disease in all its myriad forms. Since she thoroughly enjoyed her years in both farm animal and companion animal practice, this interest has persisted in diagnostic pathology.

