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**www.advancesinsmallanimal.com**

volume 31, issue 7 July 2018

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**Another Time Around the Block**

**With the Immune Response**

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Ask any veterinary student: “Which

courses in vet school really put you to

sleep?” Immunology is very likely to be

tops in the mix of responses. They’ll say it

was excruciating in seemingly irrelevant

detail, acronym-laden, had too frequent

references to inbred strains of mice, and

to make matters worse, it was usually

given first thing in the morning or right

after lunch. Snore! But, as honest prac-

titioners would admit, it is probably

the course, excluding biochemistry

* yuk! –

that deserved more attention, especially as

it relates to vaccination. These courses are

still the heroes and headaches of practice.

It therefore begs another review in the

light of more recent information.

A journeyperson’s knowledge of immu-

nology starts with the concept that defense

of the vertebrate body is a three-layered

affair. The first layer is the normal struc-

ture and physiology of the body; it’s

constitutive meaning - it’s just there. So,

it gets a lot of lip service, but consider-

ably less thought. The skin, the mucocili-

ary escalator, and peristalsis are examples

of these physical barriers and “scrub-

bing” functions. If any of these are dis-

rupted, then germs get a leg up. The plot

has really thickened in this field recently

with burgeoning amounts of information

concerning the “normal flora,” or as it is

now more technically known, the “micro-

biome.” It is another concept tradition-

ally given short shrift. Alteration of the

microbiota by management, nutrition, and

antibiotic (over)use has huge implications

for overall health as well as to how animals

respond to vaccination. Stay tuned.

If the constitutive barricades are breached,

the innate immune system is next up

in defense. It is an ancient arm of the

immune response that has enjoyed a

renaissance in the last decade or so.

Innate immunity has been taken from

an afterthought, lacking both specific-

ity and memory, to a central position in a

modern understanding of how the verte-

brate body interacts with the world. The

innate immune system is now thought

to have some memory function and be

more broadly capable of cross-protective

responses than originally conceived. With

that revival, of course, has come a lot

more mechanistic molecular information;

another anxiety-maker before midterms

and finals. But, detail aside, the important

thing to remember about innate immu-

nity is that it is essentially an inflammatory

response; in small doses, necessary and

protective; in big doses, the stuff of disease

and adverse reactions to vaccination.

The final defensive stratagem is the

adaptive or acquired immune response

–

those constellations of responses associated

with T and B lymphocytes. Traditionally,

acquired immunity has been the center

of attention for most veterinary students,

because it comprises the microbe-specific

responses related to infection and vacci-

nation, i.e., having some readily apparent

application to practice.

Recognizing that the different parts of

the immune system see the world in very

different ways can simplify understanding

the interactions that comprise immunity.

The commonality is that it all comes down

to receptor ligand-biochemical interaction,

but this is different biochemistry than

veterinarians commonly consider. The

innate immune system senses “danger” in

the world in the form of biochemical pat-

terns, or pathogen-associated molecular

patterns that are not generally found in

the vertebrate body, such as gram-negative

bacterial endotoxins. The body’s cells have

specific families of receptors to do that: