

Mechanisms underlying the link between health and damaging behaviour (tail biting)

From Beak To Tail
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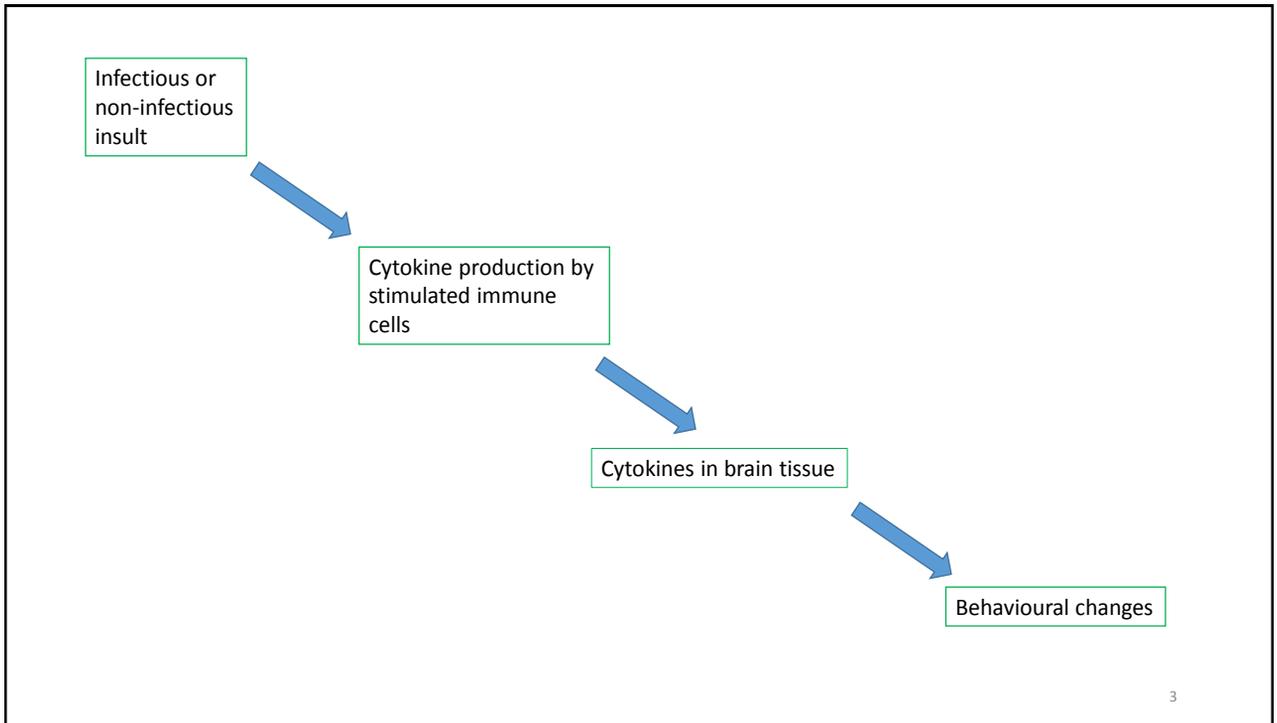


Sickness behaviour:

- Lethargy
- Malaise
- Lack of thirst and hunger
- Social withdrawal
- Reduced concentration
- Irritability
- Depression
- Reduced interest in surroundings

(Dantzer 2001; Hart 1988)

- Evolutionary advantage
- Humans isolate themselves-production animals cannot
- While sickness behaviour normally resolves once the illness is conquered, immune activation can actually contribute to longer lasting mental illness
- The understanding of this comes from studies of sickness behaviour and from reports of side effects of immune-stimulating treatment



Observations indicating a role for cytokines in mental disorders (in humans)

- In 1987, Renault published observations made on 58 patients with chronic viral hepatitis. They were treated with IFN-alfa:
- 17% developed psychiatric effects after 1-3 months of therapy
- The symptoms fell in one of three categories:
 - Irritability and short temper (mild hepatitis, high dose, weight loss)
 - Extreme emotional lability, depression and tearfulness (mild hepatitis, high dose, weight loss)
 - Delirium with clouding of consciousness, agitation, paranoia and suicidal potential (in patients with severe hepatitis and previous evidence of brain injury due to drug/alcohol abuse)
- The symptoms invariably resolved once therapy was stopped (!)

- A study found that one in three hospitalized coronary heart disease patients has some degree of depression.
- Patients with major depression that were treated with reboxetine plus celecoxib improved to a larger degree than those treated with reboxetine alone. (Reboxetine is a selective noradrenaline reuptake inhibitor. Celecoxib is a cox-2 selective non-steroidal anti-inflammatory drug)
- Patients with metabolic disorders (such as metabolic syndrome, diabetes or obesity) have chronic, low-grade inflammation with increased levels of IL-6 and CRP and these proteins are predictors of depressive score (Capuron and Lasselain 2014).

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Evidence for a role for health in the development of tail biting in pigs

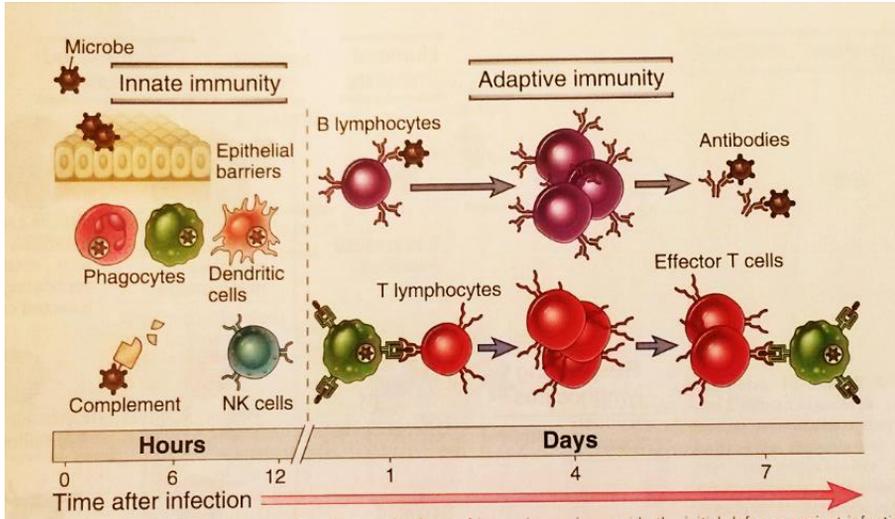
- Poor health is considered a risk factor for tail biting
- Based on
 - Experience of experts (Taylor et al. 2012)
 - Epidemiological studies/Modeling studies (Niemi et al. 2011; Taylor et al. 2012)
 - Case control studies (Moinard et al. 2003; Munsterhjelm et al. 2013; Munsterhjelm and Nordgreen et al. 2017)
 - Clinical reports (Barnikol 1978; Almond 2006)
- It can be hard to be certain of direction of effect: 'What came first? Illness or tail biting?'
- More evidence is needed



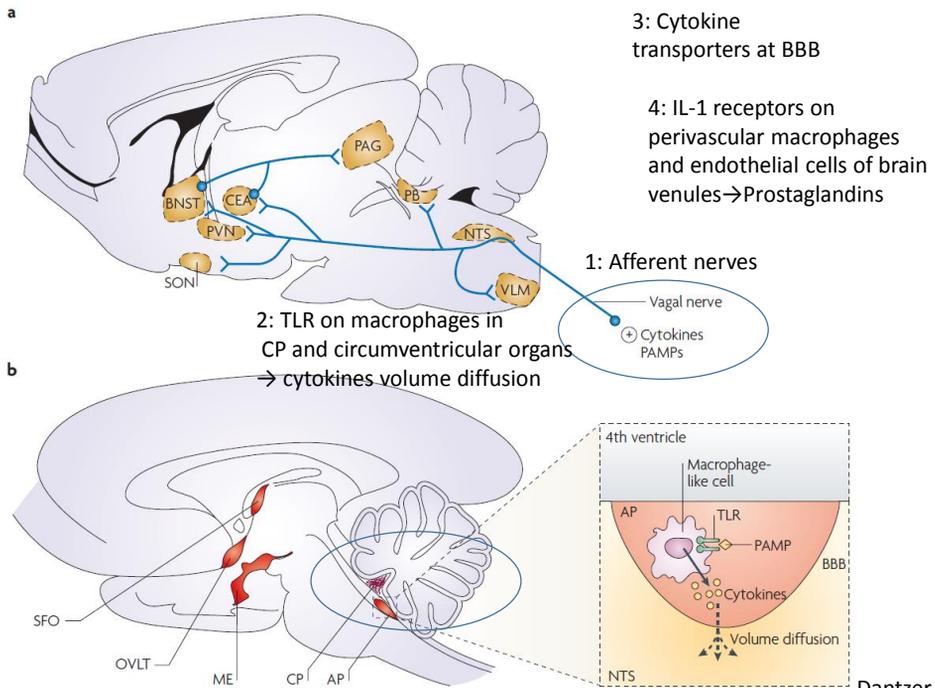
Photo credit: Mari Heinonen

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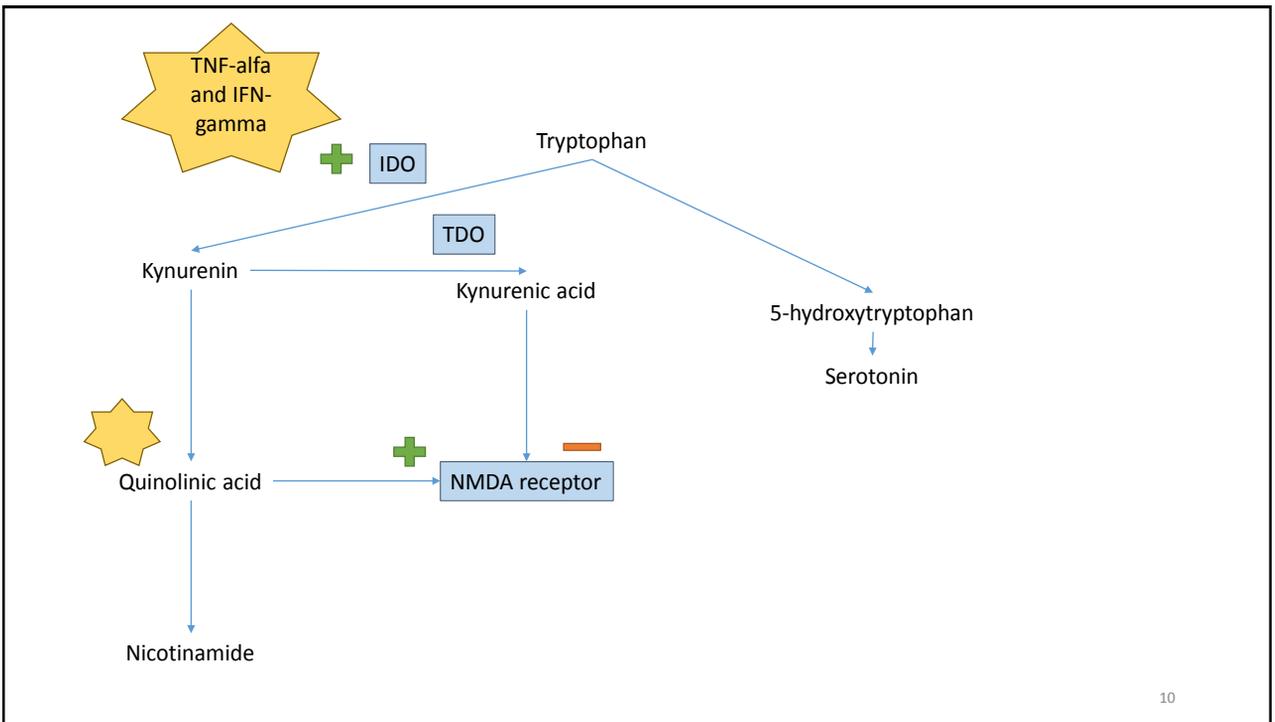
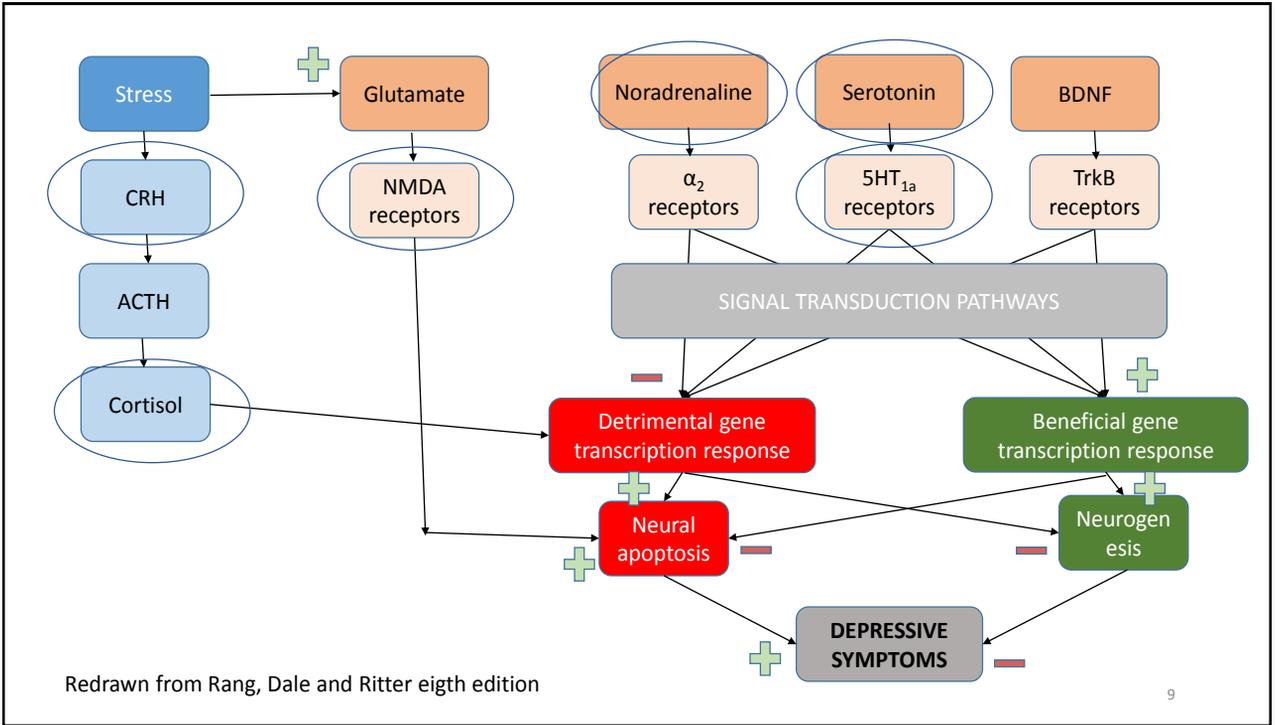
Overview over the immune system

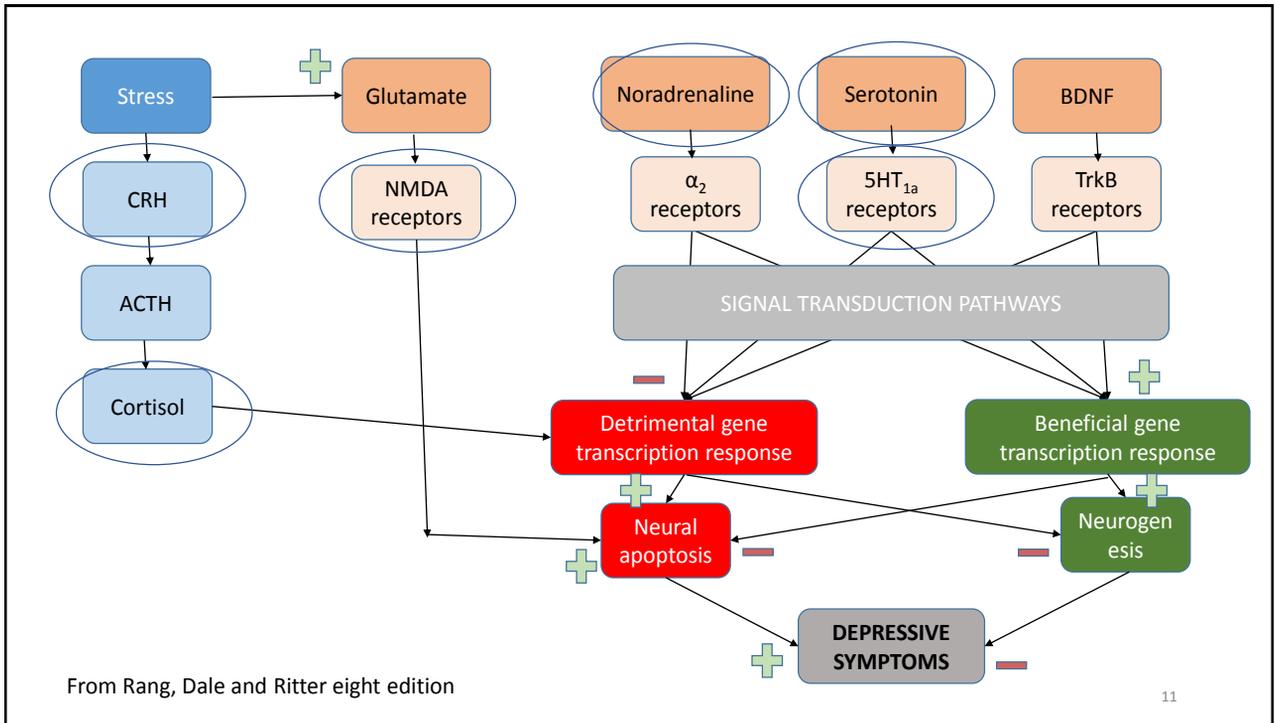


Abbas, Lichtmann, Pilai:
Cellular and Molecular Immunology ⁷



Dantzer et al. 2008 ⁸





Conclusion

- Health-through the effects of cytokines on hormones and/or neurotransmitters-has a role in the development of mental illness.
- More evidence supports this link in humans than in pigs.
- Often, the findings are correlational and cannot be used to establish causality.
- Also, the exact mechanism by which cytokines exert their effects is not known.
- Promising and exciting field in which more research is needed.



Thank you for
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