CRC for Premium Quality Wool

Metabolic Activity of the Follicle

Produced for the CRC for Premium Quality Wool undergraduate program by;
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Cell division in wool follicles

- in an average sheep, 2 billion follicle bulb cells divide per hour
  - approx 800 cells/bulb
    - bulb turnover time is 20 hours
  - 40 divide per hour
  - 50 million bulbs per sheep

17 trillion bulb cells produced per year!

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An average sheep produces 7300km wool per year

- 400µm/day length x 50 million follicles/sheep
  - 20 km of fibre length/day

    = 7,300 km wool/year

But only 1.6% of skin area is fibre

- For example, for a 20µm fibre

  $3.14 \times 10^{-4} \times 50/mm^2$

  $= 0.016\ mm^2 / mm^2$ skin

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Skin has a high rate of protein synthesis

- Skin equals about 10% of body weight

BUT

- Accounts for 10-20% of whole body protein synthesis
- Accounts for 150% of the maintenance protein requirements

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Energy utilisation in follicles

	moles ATP x 10^{-12}
DNA synthesis	0.11
RNA synthesis	0.90
protein synthesis	36.04
protein turnover	9.01
aa transport	9.01
Na/K transport	6.10
TOTAL	61.17 x 10^{-12} moles ATP

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