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CELL SIGNALLING

New communication skills

Cell-to-cell communication can take numerous forms, including chemical or hormone-mediated signalling and direct cell-to-cell contacts. A study in *Nature Cell Biology* suggests that some cells may also signal to each other by secreting exosomes that are packaged full of mRNAs and microRNAs.

Exosomes (not to be confused with the macromolecular machines that degrade RNAs) are small vesicles of endocytic origin. They are formed within larger multivesicular bodies that can fuse with the plasma membrane to release exosomes into the extracellular

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environment. The functions of exosomes are poorly characterized but it has been postulated that they interact with cells, into which they might deliver their contents.

To identify potential cargoes for exosomes, Valadi *et al.* profiled the composition and contents of exosomes derived from mast cells and found them to be substantially enriched in small RNAs and mRNAs. The profile of RNAs found in exosomes was different to the profile found in the cytosol. For example, exosomes contained no ribosomal RNAs but contained large numbers of 19–22 nucleotide microRNAs, indicating that RNAs are packaged into exosomes by an active mechanism. Under the correct conditions, mRNAs contained in the exosome could be translated into

proteins, which shows that these mRNAs are functional.

To test whether exosomes could traffic mRNAs between cells, Valadi *et al.* incubated mouse-derived exosomes with human mast cells. After 24 hours, several mouse proteins were found to be expressed in the mast cells. It remains unknown how exosomes are taken up by recipient cells, but this process seems to be cell-type specific.

The authors propose that exosomes can transport RNA, which they call ‘exosomal shuttle RNA’ (esRNA), between cells. Potentially, esRNA could have widespread effects on protein levels in recipient cells because microRNAs can downregulate the expression of large numbers of genes. However, the physiological significance of this mechanism is unclear; how exosome secretion is regulated and whether exosomes can regulate protein levels in recipient cells *in vivo* is unknown.

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ORIGINAL RESEARCH PAPER Valadi, H. *et al.* Exosome-mediated transfer of mRNAs and microRNAs is a novel mechanism of genetic exchange between cells. *Nature Cell Biol.* 7 May 2007 (doi:10.1038/ncb1596)