Let $G$ denote a multigraph with edge set $E(G)$, let $\mu(G)$ denote the maximum edge multiplicity in $G$, and let $P_k$ denote the path on $k$ vertices. Heinrich et al. (1999) showed that $P_4$ decomposes a connected 4-regular graph $G$ if and only if $|E(G)|$ is divisible by 3. We show that $P_4$ decomposes a connected 4-regular multigraph $G$ with $\mu(G) \leq 2$ if and only if no 3 vertices of $G$ induce more than 4 edges and $|E(G)|$ is divisible by 3. Oksimets (2003) proved that for all integers $k \geq 2$, $P_4$ decomposes a connected $2k$-regular graph $G$ if and only if $|E(G)|$ is divisible by 3. We prove that for all integers $k \geq 2$, the problem of determining if $P_4$ decomposes a $(2k+1)$-regular graph is NP-Complete. El-Zanati et al. (2014) showed that for all integers $k \geq 1$, every $6k$-regular multigraph with $\mu(G) \leq 2k$ has a $P_4$-decomposition. We show that unless P = NP, this result is best possible with respect to $\mu(G)$ by proving that for all integers $k \geq 3$ the problem of determining if $P_4$ decomposes a $2k$-regular multigraph with $\mu(G) \leq \left\lfloor \frac{2k}{3} \right\rfloor + 1$ is NP-Complete.